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The ATARI® Resource

MAY 1983, VOLUME 2 NUMBER 2

Communications



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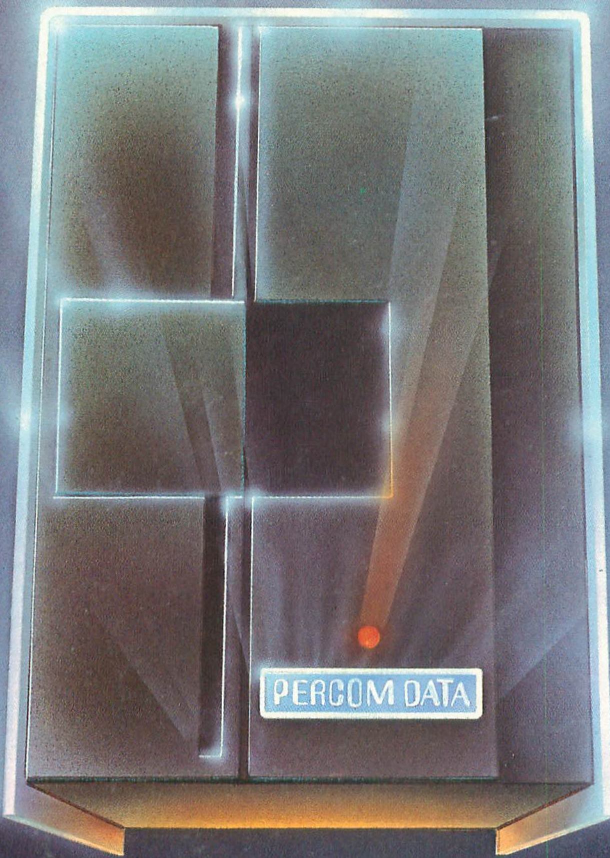
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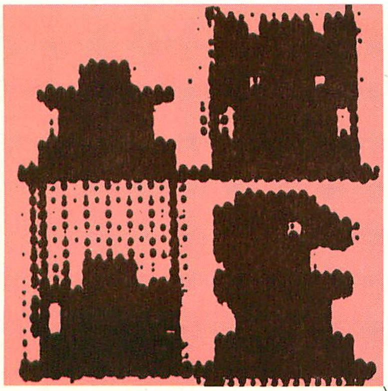
ATARI® 1200XL™

HOME COMPUTER


PERCOM DATA

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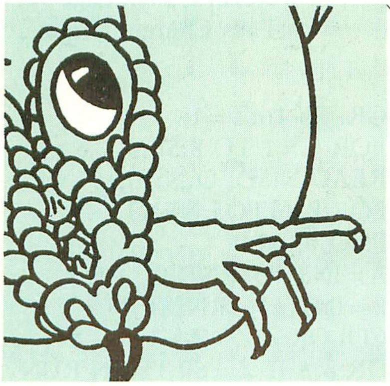
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Advertising/Production Coordinator
Linda Tapscott

Advertising Sales
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(415) 221-0214

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I/O BOARD

QUESTION MARK

Programmers new to ATARI BASIC wonder about the question mark that appears following an INPUT statement. It generally looks something like this:

WHAT IS YOUR NAME?

If you don't want to phrase the prompt as a question, and only need a single-key response, you can open a channel to the keyboard:

```
10 PRINT "ENTER MENU ITEM"
20 DIM AN$(1):OPEN #1,4,0,"K:":
   GET #1, A
30 AN$ = CHR$(A):CLOSE #1
```

This returns the ATASCII code only for the last key pressed. To get more than one-key input, adapt the technique of this example:

```
10 DIM NAME$(10)
20 OPEN #1,4,0,"E:"REM OPEN A
   CHANNEL TO SCREEN
   EDITOR
30 ?:? "Enter your name and press
   [RETURN]" :INPUT #1,
   NAME$
40 ?:? "Now your age.": INPUT #1,
   AGE
50 ?:?:? NAME$;" is ";AGE;" years
   old.":CLOSE #1
```

Keep in mind that opening a channel to the screen editor (line 20) resets the Graphics Mode to 0, clears the screen and sets colors to default values. If you are planning a fancy Graphics 0 format, set it up after opening the channel to "E:"

Harvey Bernstein
San Francisco

PAIN IN THE NEC

Is there any way one can use the Atari Word Processor with a NEC PC 8023 AC printer? I can only get double-width type in my printouts (see sample below).

Martin Torres
San Jose, CA

I am happy to report that, despite a boxed errata note printed in ANTIC (–4, page 72), the NEC 8023 printer is compatible with the Atari Word Processor.

Normally, the Atari Word Processor instructs the NEC to print double-width because of differing control codes. I found that by having the printer de-selected or turned off when I started printing, and then selecting or turning it on a few seconds later, the print-wide command was lost and the printer then printed normally. If I subsequently send a command to the printer to print double-width, I cannot stop without turning the printer off, but this hasn't been an inconvenience so far.

F. H. Dill
South Salem, NY

HALPERN SPINOFFS

I enjoyed the program by Marc Halpern in issue #6. Here is a short program I designed to show off the colors and work in an echo effect with ATARI's sound. You might consider a short section in ANTIC for youngsters like us to display our programs.

Kevin O'Neill (age 11)
Falls Church, Virginia

```
10  GR. 7+16:Z=1
110 FOR C=1 TO 8:SE.4,C,8
120 READ N:SO. O,N,10,15
220 FOR P=1TO5:NEXT
    P:SO.0,0,0,0
225 A=INT(80*RND(0))+1:
    B=INT(156*RND(0))+1
227 COLOR Z:Z=Z+1
230 DR.B,A:IF Z=60 THEN RUN
240 FOR P=1 TO 5:NEXT P
250 FOR L=15 TO 0 STEP
    -1:SO.O,N,10,L
270 NEXT L:NEXT C:RESTORE
320 GOTO 110
510 DATA 91,121,72,64,121,81,
    60,121
```

continued on page 9

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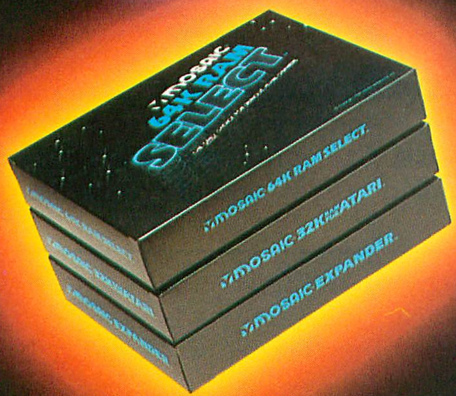
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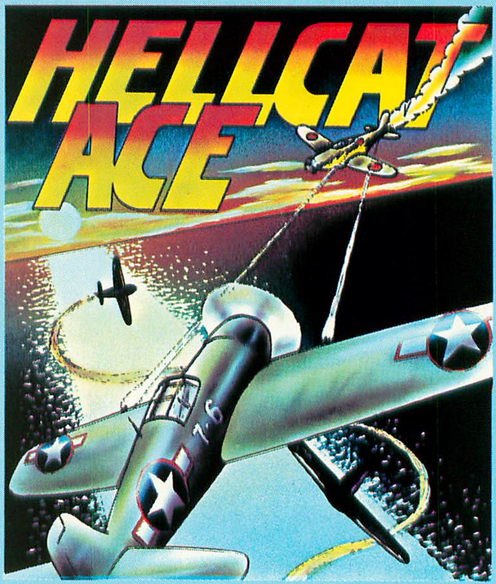


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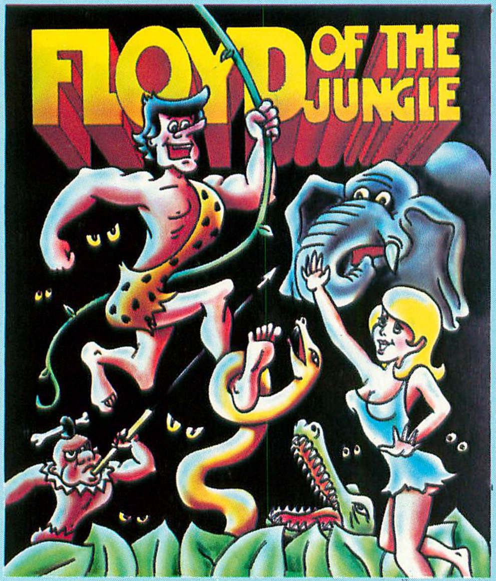
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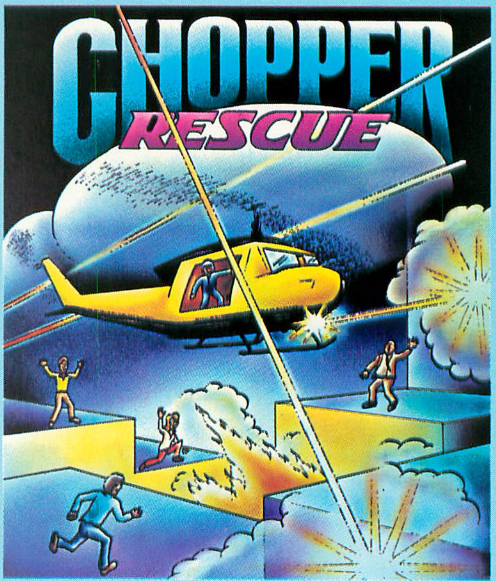
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DEALER INQUIRIES WELCOME!

In ANTIC #6 a young programmer named Marc Halpern wrote a very nice program in Graphics 7.

If you have a GTIA chip and change it to the enclosed listing, you can get a few more colors on the screen. Try it.

David Milligan
Sacramento, CA

```
10 GRAPHICS 11
20 FOR X=0 TO 78
30 C=C+1:COLOR C:IF C=127
   THEN C=0
40 PLOT X,Y:DRAWTO 78-X,Y:
   DRAWTO 78-X,191-Y:
   DRAWTO X,191-Y:
   DRAWTO X,Y
50 Y=Y+2:IF Y>191 THEN Y=0
60 NEXT X:GOTO 20
```

SHORT WAVE SALUTE

My heartfelt *thanks* for forwarding inquiries concerning our Ham Radio/SWL on-the-air meetings. Your concern for your readers has been a great factor in the growth in the number of ATARI Computer System users.

Our journal, "Ad Astra . . .", has grown into the largest users' group publication with emphasis on hardware. I always look forward to receiving "ANTIC" and wish you well in the future.

Jack McKirgan II,
WD8BNG
Washington C.H., OH

GENEALOGY

My husband and I are working on a genealogy program for ATARI computers. We have two versions: one for the hobbyist and one for the serious researcher. It will be marketed under the name of RONAN software.

Ron and Nancy
Bateman
San Diego, CA

In response to your inquiry on genealogy software, try the newsletter from

Genealogical Computing
5102 Pomeroy Dr.
Fairfax, VA 22032

Also refer to the Nat'l. Genealogical Society Quarterly (Vol. 69, Mar. 1981, p. 3) "Personal Computers for Genealogists" by Jack McKay.

Joan Ice
Seattle, WA

Genealogical research was one reason why I purchased my ATARI 800. I have a program for entering data about each individual, and another program to print out this data in a usable chart form.

Please pass this on to James Imhulse — maybe we could get together.

Frank W. Bassett, Jr.
15313 Blacksmith Terr.
Woodbridge, VA 22191

SEE DICK RUN

We purchased a PERCOM Double-Density Disk Drive — because we wanted the increased storage capacity. We also purchased a Synapse's File-Manager 800+ to organize our data. Unfortunately, after committing to both, we discovered that FileManager only works in the single-desnity format.

Since we are not programmers, we are wondering if you know of a program similar to FileManager that can take advantage of our double-density drive.

Joyce Alman &
Jack Thorne
Mountain View, CA

We checked with the manufacturers of the three most capable data base systems. LJK (Data Perfect) and Synapse (FileManager+) do not now support the double density mode on PERCOM disks. CE Software's CCA Data Base has been modified to support double-density. These modifications are available, we understand from a CCA user.

The first law of purchasing is: "See Dick run." Untold misery is averted by actually seeing software performing on the hardware as you configure it. We suggest that users always see a demonstration or have full return privileges at a responsible dealer before *buying.*

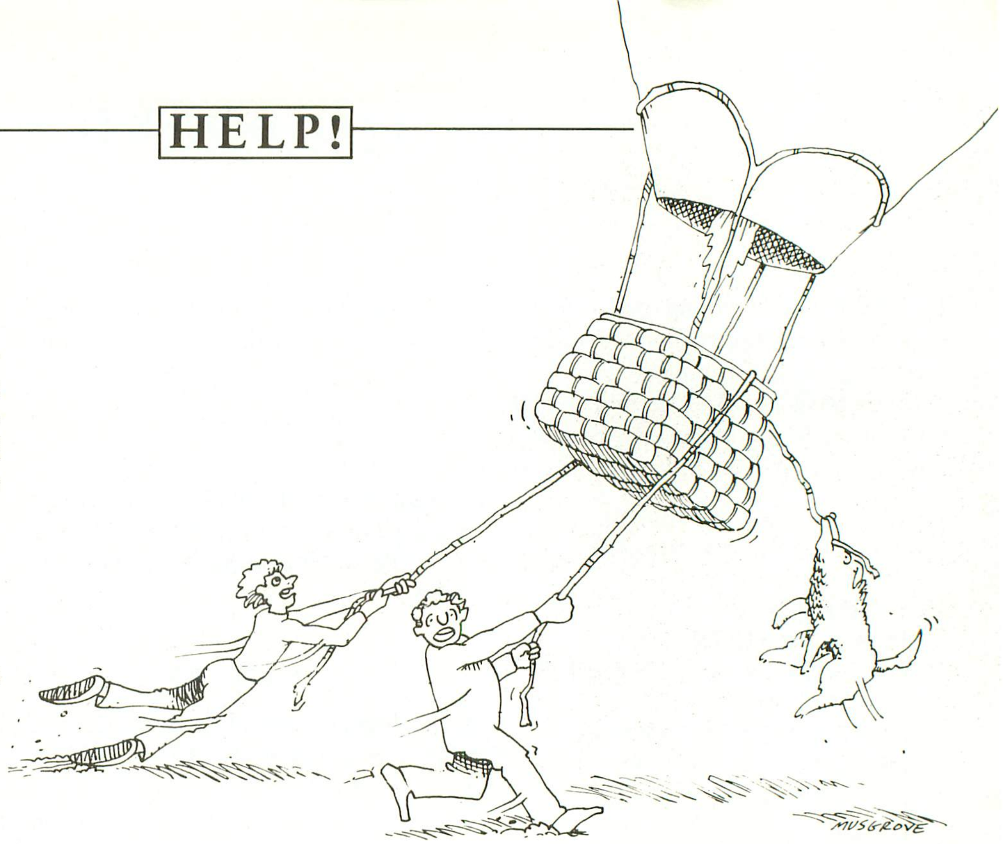
TIMING ROUTINE

I'm enclosing a timed routine that I used in a math program for my son. I'm also enclosing a copy of the program, which I'm sure could be polished and improved.

The program selects 25 random multiplication problems, times the answers, and holds missed problems in a string to be given again.

Bonnie Plagge
Hebron, KY

```
10  DIM B$(1)
20  T=0
30  OPEN #1,4,0,"K:"
40  REM USE EXAMPLE
50  ?" 2*4 = ";
60  X=2*4
70  GOSUB 500
80  END
500 REM TIMED INPUT
510 POKE 764,255
520 T=T+1
530 IF PEEK(764)< >255 THEN
    GET #1,B
540 B$=CHR$(B)
550 IF B$=CHR$(0) AND T>400
    THEN ?:? "TIME'S UP":
    GOTO 590
560 IF B$=CHR$(0) THEN 520
570 Y=VAL(B$)
580 IF X=Y THEN ?X:?
    "CORRECT":GOTO 600
590 ?:? "THE ANSWER IS";X
600 RETURN
```



ATTRACT ATTACK

When you can survive at Stellar Defense (ANTIC, #5) for longer than nine minutes, "attract mode" is triggered and the screen changes color and luminance. To prevent this, make the following changes:

```
636 IF WAVE > 0 THEN
      POSITION 13,15: ? "FREE
      HUMAN": POKE 77,0
```

POKE 77,0 resets attract mode with each new wave.

R.L. Morrison
Winslow, AZ

TEACHING SOUNDER

I loved *Sounder* from ANTIC #6, and eagerly look forward to PILOT in each issue.

In Sounder, M: statement (line 530) you are not getting full use of voice 2 because your matches do not have spaces fore and aft. Try:

```
530 M: 5 , 10 , 15 , 20
```

and listen to the difference.

Also, may I use Sounder when I am teaching PILOT? Ken Harms and ANTIC will, of course, be given full credit for it.

Thanks for your time and your enlightening articles!

Kathy Bergh
Puyallup, WA

The spaces fore and aft make PILOT search for an exact match with spaces. As originally written, the data item "15" (which turned on voice 2) actually matched against "5" and turned on voice 0 instead. The spaces prevent this partial string match.

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SEEING DOUBLE

I inadvertently changed the name of one file on my disk to the exact name of another file on the same disk. I now have two files on the same disk with the same name and I am unable to access the second file. If I try to change the name or delete one of the files, both are affected. Will I ever see that second file again?

Kenneth R. Wachtel
San Francisco, CA

Follow this procedure:

1. Load file and transfer to another disk (for backup).

2. Type POKE 3118,0 [RETURN] (immediate mode, no line #).

3. Go to DOS.

4. Delete the file (DOS option D), and only the first one will be deleted.

5. Go back to BASIC (DOS option B), POKE 3118,184 (back to normal), and all will be well. You will end up with the first file on another disk, and the second file on the original disk.

TINY COMPLAINT

I typed in Tiny Text (ANTIC #6) and it runs fine. My complaint is that the entered text does not display long enough in Display Mode. The program would be even better if the display didn't go to the menu so soon after the last line. How can I lengthen the time the letter stays on the screen? Also, in line 600, is the assignment P = 240 really needed twice? Since P = 240 is in line 600, is line 610 necessary? Line 670 says: GOTO 620. There is no line 620, so what is line 670's purpose?

Nancy Hamel

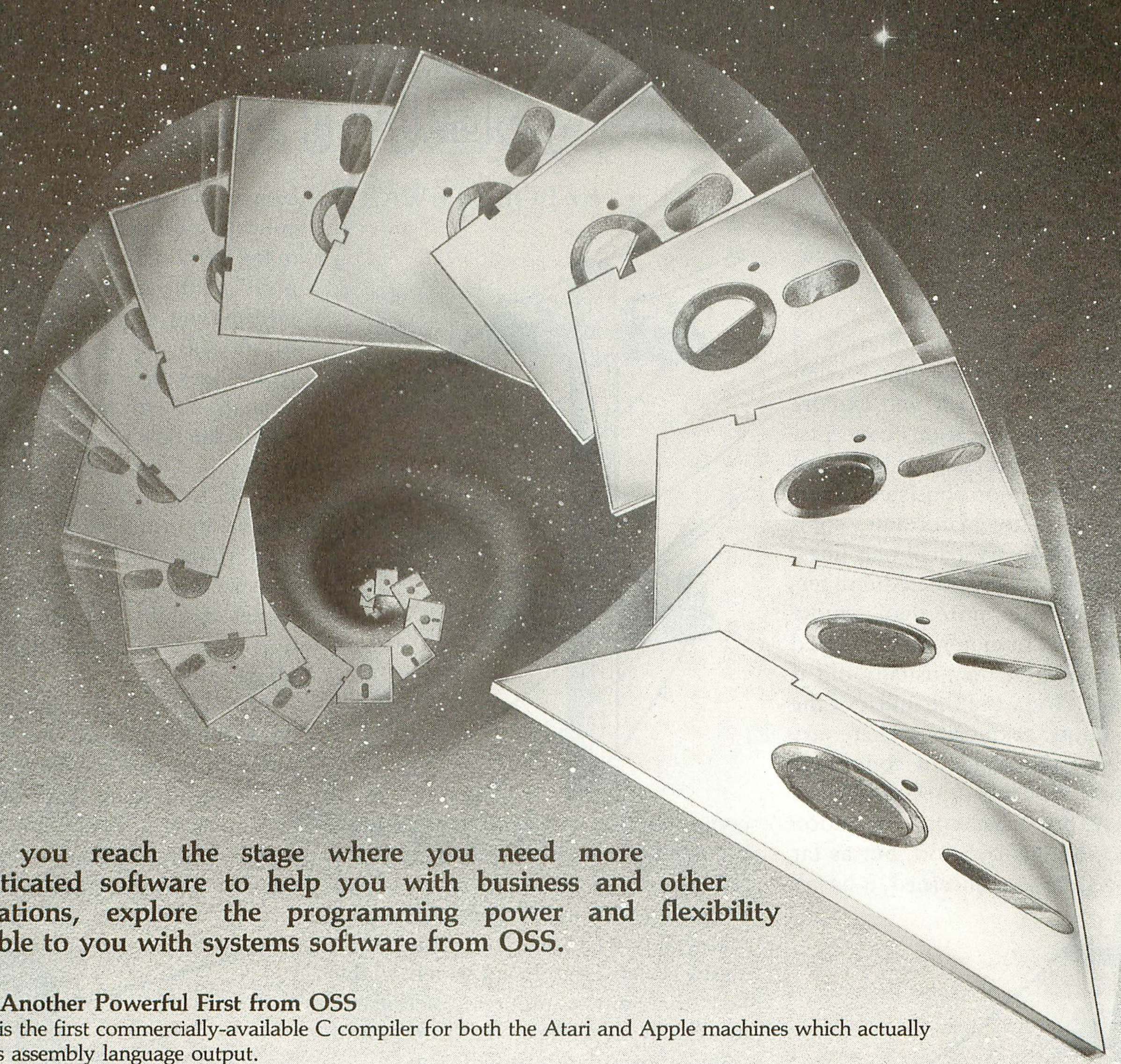
If you want the program to wait at the end of Display Mode, insert the following line:

```
845 IF OP=5 AND FL AND PEEK
    (53279) <> 6 THEN 845
```

To proceed, press [START].

As for your other questions, we can understand your confusion. The program was published exactly as submitted, and since it worked, we didn't examine the listing carefully. We can't explain the double assignment in line 600, but there is a "GOTO 710" at the end of line 600, so the P=240 in line 610 is probably necessary. As for line 670, it is never executed, so there is no need for the line 620 to which it refers. This sometimes happens when programs are not thoroughly cleaned up after development.

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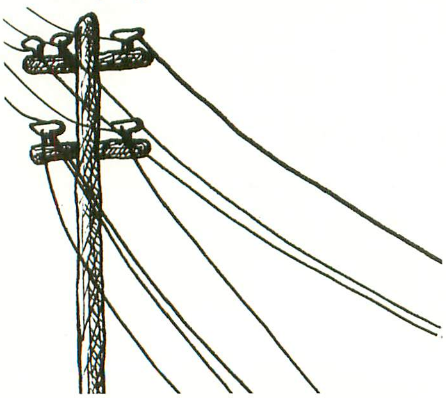
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COMMUNICATION CONCEPTS

Wherever you turn, whatever you read, it seems someone else is declaring *The Computer Revolution*. The information age is dawning, and we ATARI owners are part of it. Central to the information age is the distribution of information through computer communications. This article will explore some basic communications concepts.

Back about 10 years ago, most computer communication consisted of terminals talking to mainframe computers over ordinary telephone lines. Those terminals, now called dumb terminals, were little more than remote typewriters. If computer users wanted to exchange data, they usually did it with a tape. Today, in the midst of the microcomputer explosion, there are hundreds of thousands of computers with information that others could use.

You'd expect that communication would have advanced, too, but as far as most people are concerned, it hasn't

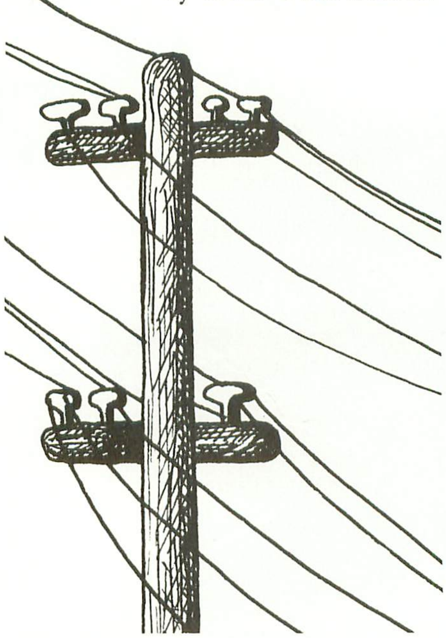


much. We microcomputer owners still exchange tapes, or, if we're a little better off, floppy disks. The closest we usually come to true computer communication is through terminal emulation.

Terminal Emulation

We can run a program on our computer that will make it behave like a terminal. It can then talk to another

by BOB STEWART



computer over a telephone line, with the remote computer acting as if it's talking to a terminal. As far as access to remote information goes, this works reasonably well for a lot of purposes. There is also a significant benefit to the fact that our computers, acting as **intelligent terminals**, can do some things that dumb terminals can't.

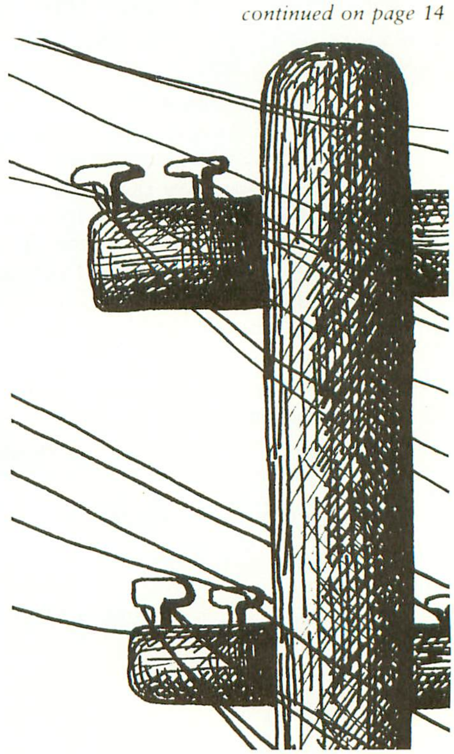
Before going further into some of the things your intelligent terminal can do, let's take a look at what's available in remote computers. There are two major services available today: **bulletin boards** and **information services**. Other services, such as using your computer as a remote bank teller, are coming, but are not yet widely available.

Many computer user groups and individuals offer *free* bulletin board services. These are computers that you can call on the phone to leave or look at messages. It's just like an ordinary bulletin board; all it costs is your telephone charges.

Information services are an extension of this same idea, based on the concept of **timesharing**. This allows many terminals to use a large computer at the same time. Commercial information services may be oriented to specific information, such as the Dow-Jones stock service, or general information, with news, buying guides, and other data bases that you can peruse. CompuServe and The SOURCE are examples of these. The general information services also offer such things as bulletin boards, live conversations with other users, and games. Usually you pay for the time that you are connected, plus your phone call.

Although this sounds pretty good, be warned that since the remote computer thinks you're a dumb terminal, it won't do anything fancy. You usually end up with a 40-column "glass teletype". Unless either your terminal emulation program or the remote com-

continued on page 14



ATARI SINGS YOUR FAVORITE SONGS!!!

THE Original VOICE BOX Speech Synthesizer by the ALIEN GROUP has received rave reviews:

MICRO COMPUTING—"The VOICE BOX injects an endearing personality to your computer. The possibilities are enormous."

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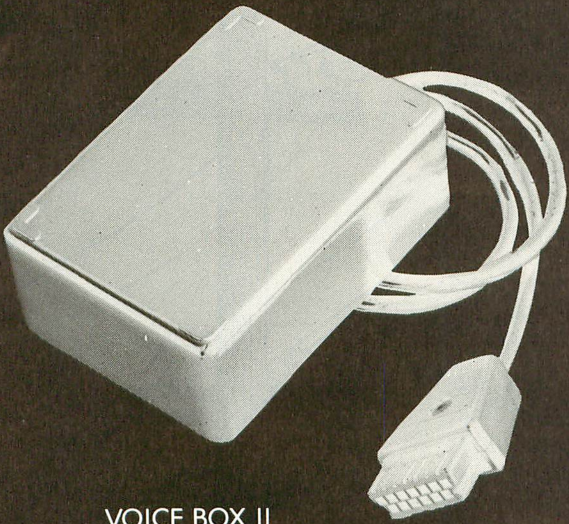
POPULAR SCIENCE—"The speech quality is excellent. Besides creating speech, the software has a bit of fun with graphics."

and on the new VOICE BOX II......

TIME MAGAZINE—"Machine of the Year" "The VOICE BOX by the Alien Group enables an ATARI to say aloud anything typed on its keyboard in any language. It also sings "Amazing Grace" and "When I'm 64" or anything else that anyone wants to teach it.



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- A singing *human* face with lip-sync animation designed by Jerry White.
- A talking or singing ***ALIEN*** face with software that allows the user to change the face and 8 mouth patterns as he sees fit.
- The ability to speak with inflection and feeling.
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- **GREEN GOBLINS**—A talking arcade game by John Wilson.
- Random Sentence Generator—An amusing grammar game that helps teach school children to identify parts of speech and recognize a variety of sentence structures.
- **NUMBER SPEAK**—A subroutine by Scott Matthews that converts up to a 9 digit number into normal English pronunciation. Ideal for building your own math games.
- **STUD POKER**—A talking poker game by Jerry White.
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- Singing or speaking subroutines can be incorporated into your programs, requiring as little as 100 bytes of RAM plus 5 bytes for each word.
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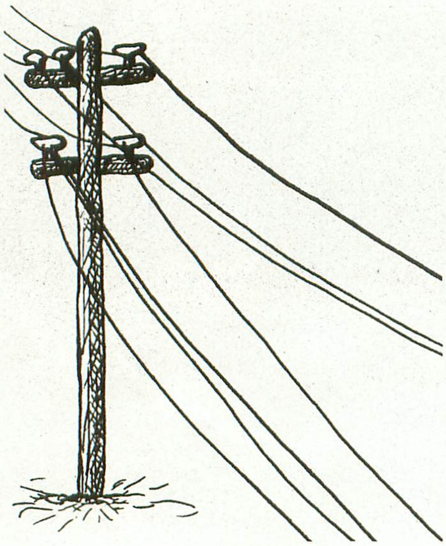
ALSO AVAILABLE AT LEADING COMPUTER STORES THROUGHOUT THE WORLD.

COMMUNICATIONS CONCEPTS
continued from page 12

puter is pretty smart, you get only those capabilities that *all* terminals have, which are few.

Smart Terminals

Now we'll look at the potential advantages of your intelligent terminal. Which of these advantages it actually has depends on the terminal emulation program you use. Before you buy a terminal emulator, make sure it can do what you want.



The major advantage is that your intelligent terminal is really a general-purpose computer. It will run all kinds of programs, You can use it to play Star Raiders, catalog your record collection, or write your own programs. If it was just a terminal, even an intelligent one, you probably wouldn't own it at all.

As an intelligent terminal, your computer's power stems from its ability to take input from, or direct output to, different peripherals. You can have it record output on printer, tape, or disk, as well as on the screen. Since your computer has its own memory, it can **buffer** data you receive and write it to a peripheral device after you disconnect. That means big savings in connect charges. You can even set up all your input beforehand and reduce the connection charges that would have been incurred to accomodate your typing speed and mistakes.

Up- & Down-Loading

Many bulletin boards and information systems offer programs that you can copy, or accept programs you want to offer. The process of copying such a program to your system from a remote computer is called **down-loading**. The reverse process is called **up-loading**. This process is subject to errors caused by line noise, so you must check the results when the transfer is complete.

Information passed between terminal emulator and computer must be in ASCII form (printable characters, like you get from a BASIC LIST command). Data in arbitrary binary form (as from a BASIC SAVE command) cannot be handled this way. Passing binary data requires more complex rules of conversation (a **protocol**), which can also do things like error correction. These more complex communication techniques are used in the coming wave of computer communication, the network.

That covers the software concepts we need, so let's discuss the hardware.

Modems

For your computer to talk over a telephone line, you need a **modem**. A modem *modulates* digital signals from a computer into audible, analog signals, puts them into a telephone line, and another modem *demodulates* them at the other end (hence the name, *mo-dem*).

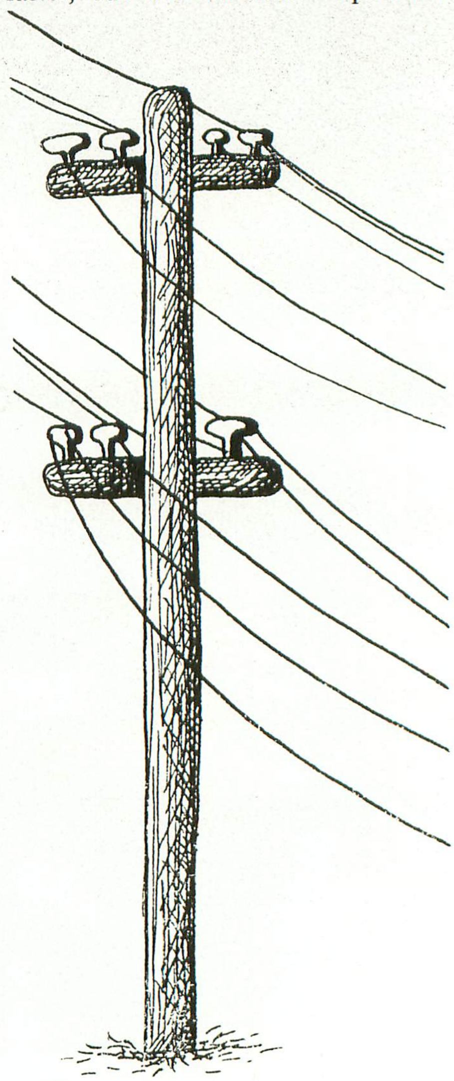
Modems transmit (talk) on one frequency and receive (listen) on another. Each modem must receive on the other modem's transmit frequency. If they both talk on the same one, the signals will ruin each other, and neither will hear it anyway. We therefore designate one modem as the **originate** side (usually the caller) and the other as the **answer** side (the callee). It doesn't matter which is which, as long as both agree.

A protocol that allows both sides to send at the same time is called **full-duplex**. If they *must* take turns, it is called **half-duplex**. In human terms, telephone conversations are full duplex and CB radio is half duplex. Again, both sides must use the same protocol.

Baud Rates

A modem's send and receive speeds are expressed as **baud rates**. For our purposes, you can think of this as bits per second. A 300 baud modem (the most common type) sends and receives at 300 bits/second, also called 30 characters (bytes) per second. You may notice that at eight bits per byte we lost a few bits of speed between 300 and 30. The modem uses a couple of bits per byte for purposes of its own.

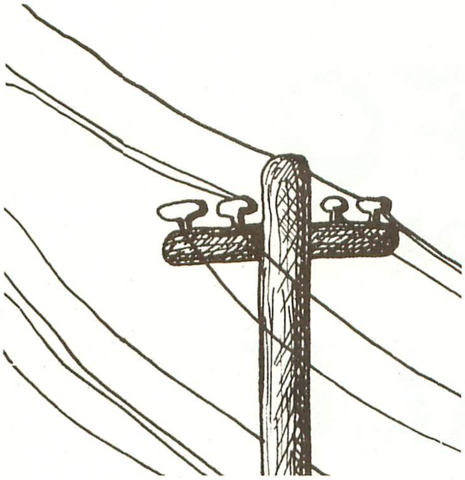
An increasingly common transmission speed is 1200 baud. It's four times faster, but it's also more expensive.



Also, since both ends must agree on the speed, be sure your receiving party can also use 1200 baud before you spend extra money. If you can afford it, your best bet is a modem that supports either speed.

RS-232

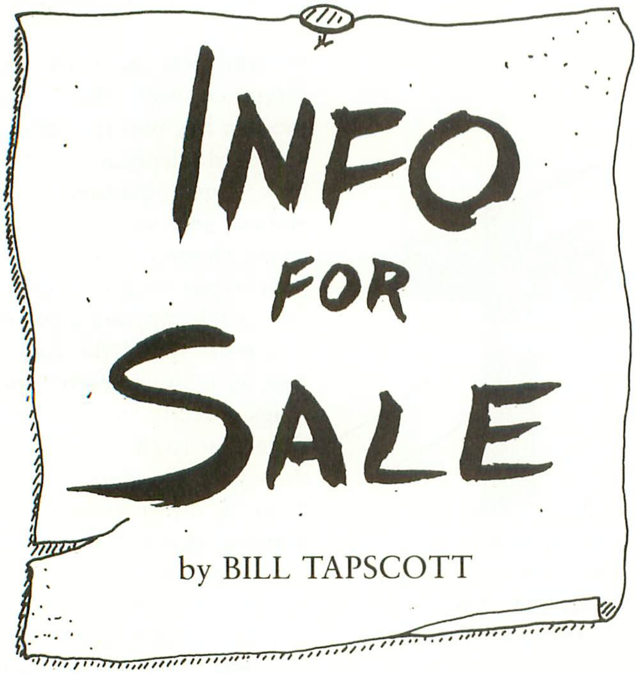
You need some way to attach the modem to your ATARI and to your phone. For this we have hardware interfaces. On the computer side, the most common is **RS-232**. RS-232 is a standard arrangement of pins and electrical signals that allows all kinds of different equipment to communicate. The ATARI doesn't have a built-in RS-232 compatible connector, so for any RS-232 modem you'll need an ATARI 850 Interface Module, which gives you four RS-232 connectors. You also need a cable with the right kind of connector at the other end (they don't



always come with modems). There is also at least one modem, designed especially for the ATARI, that connects through the joystick ports. This works fine, but being non-standard, it requires special software and is not compatible with software that expects RS-232.

On the phone side, there are two possibilities: **acoustic coupled** and **direct connect**. An acoustic-coupled modem has two rubber cups that fit a standard telephone handset. They can leak noise, causing communication errors, and won't fit your modern, funny-shaped phone. Besides, you have to put the proper end of the handset in each cup, and if you get it wrong, you must redial the call. Direct connect is a much better method. This plugs directly into a telephone jack, either by itself or with your phone, through a Y-connector. If you're *really* flush, a direct connect modem with **autodial** doesn't even need a phone. On command from the computer it will dial for you.

That about wraps it up. With these concepts, you are prepared to learn more about communication for your ATARI, and to make a start at deciding how you will share in the information age.



by BILL TAPSCOTT

When television invaded the American home a window opened onto a huge world of information and experience never dreamed of by our forefathers. Now telecomputing is expanding that view, with one important embellishment, that of choice.

The ATARI owner, equipped with a modem and appropriate software, cannot begin to imagine the thousands of different adventures available on his home television screen, and the number grows every day. The accompanying chart shows just a few of the possibilities, at least some of which should stir your imagination.

First, a tip if you have not yet bought your modem and software. As a promotion for the three major information utilities — CompuServe, The SOURCE, and Dow Jones/News Retrieval Network — a set of coupons are included when you buy TeleLink or the Communicator Kit from Atari. TeleLink is the software cartridge that enables you to access these and other networks. TeleLink I sells for about $30.00, but is limited. The new Communicator Kit costs $275 and includes the Atari 835 Direct-Connect Modem, TeleLink II (an upgraded version of TeleLink I) and the three coupons offering the one free hour on each of the three utilities.

Each company honors the coupons in a slightly different way. CompuServe allows you to "log on" for one full hour. If you decide to subscribe during that time, you can sign up online and avoid the membership fee. With The SOURCE coupon you get a number to call and a temporary ID and password. If you decide to buy after your free hour, you still must go back to the dealer and pay the $100.00 fee.

With Dow Jones, your coupon number is exchanged for a password. You can then subscribe by mailing a contract and avoid the $95 fee. A $7.00 instruction manual is recommended.

If you do not have a coupon, you must purchase through a dealer that sells subscriptions to the service of your choice. The cost of these startup kits is indicated in the chart.

There are few differences in service between CompuServe and The SOURCE. The World Book Encyclopedia and an ATARI Bulletin Board are two features of CompuServe which do not seem to be duplicated by The SOURCE. However, the startup charges and hourly rate could affect your choice. If you can access CompuServe through a local CompuServe number, as opposed to a Tymnet number, the cost difference could be conclusive.

The Dow Jones/News Retrieval Network provides fast, pertinent, valuable information to investors, and others with mainly financial interests. The hourly rates seem high, but might not be considered so if the information makes the difference between losing or making significant money. The late breaking news service, called Dow Jones Newswire, claims only a 90-second delay on news items that affect the financial world. Students and writers will appreciate the Academic American Encyclopedia now available on what Dow Jones calls, "The Broadtape."

DIALOG, located in Palo Alto, and BRS, located in Latham, New York, are two, huge data bases used mainly by the scientific and business communities, but they are also available to the home-computer market. DIALOG's evening service is called Knowledge Index, while BRS's is called BRS/After Dark. Thousands of journals, speeches, articles, reports, etc. are listed, described and excerpted for the subscriber. Rapid searches using key words and phrases can quickly identify any pertinent information on almost any given subject.

Knowledge Index has a startup fee of $35, which includes two free hours, and then charges $24 an hour. While on-line, you can order any document they have. The document will be mailed to you for a $4.50 fee, plus twenty cents per page for copying. Besides the 40 computer magazines listed, there is a software listing of 10,000 programs for mini and microcomputers. Soon these can be ordered and received through the mail in disk form. DIALOG is accessed through TYMNET and TELENET numbers, the cost of which is included in the hourly rate. For more information call (415) 858-3810.

BRS/After Dark says they offer even more information in more categories than does DIALOG. Their startup fee is $50, but the hourly rate is lower, $6 to $15. They expect to provide document delivery service by mid June. They now have the Academic American Encyclopedia, the same as Dow Jones, and will be adding electronic mail soon. They are accessed

continued on page 18

INFO FOR SALE
continued from page 16

through UNINET and TELENET numbers. Call (518) 783-1161 for more information.

A totally different service is offered by GameMaster. For a $10 startup fee, which includes three free hours and eight pages of documentation, you can get on-line. A $40 startup fee includes eight free hours and 50 pages documentation, which describes all the games and features. The hourly charge is $3 round the clock, and you pay your own long-distance charges to Evanston, IL. No other local numbers are available, but GameMaster hopes to duplicate the service in other locations.

When you get on-line with GameMaster you enter a 35-room, electronic Mansion. Each room offers a different activity or information. Ten rooms contain games. In the Kitchen you find recipes, some offered by subscribers. You go to the Parlor to "talk" to anyone else on-line who wants to talk with you. Horoscopes are found in the Solarium. The Classroom contains language, math and other educational aids. A lot of imagination has gone into the design of GameMaster. For more information call the very friendly people at (312) 328-9009. This service is also explained and promoted through a Bulletin Board at (312) 475-4884.

COMMUNICATION COMPARISON CHART

	CompuServe Columbus, OH	The SOURCE McLean, VA	Dow Jones News/Retrieval
Registration Fee	19.95–39.95[A]	100.00[A]	95.00[A]
Prime Time Rates[B]	22.50–32.50[C]	20.75	36.00–72.00
After 6 P.M. Rates	5.00–7.00[C]	5.75–7.75[D]	6.00–28.00
News Service	Associated Press	UPI	Dow Jones Newswire (90 Sec. Delay)
Various Newspapers	Yes	Yes	
Stock Market	Reports	Reports	Current Quotes[E]
Electronic Mail	E Mail	Yes	
Conversation	CB Simulator	Chat	
Hobbies—Games	Yes	Yes	
Travel Service	Yes	Yes	
Encyclopedia/Research	The World Book Encyclopedia	Information on Demand	Academic American Encyclopedia
Program/Storage	Yes	Yes	
Bulletin Boards	Atari	May use Atari headings	
Shopping Service	Yes	Comp-U-Store	
Information Numbers	(800) 848-8199	(800) 336-3366	(800) 257-5114
Local Access Numbers	200 CompuServe 200 TYMNET	200	400 TYMNET

A See text on coupon promotion
B Prime time is business hours & days, local time
C Higher Rate is for number called through TYMNET
D Lower Rate is after midnight
E 15 minute mandatory delay

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TRS-80 is a Tandy trademark
Maxi-DOS A is a Micro Mainframe trademark
Z-80 is a Zilog trademark

* Atari® DOS required
** Requires Maxi-DOS A® (available mid '83)
*** Requires Oasis® Software

TALKING TO BIG BROTHER

by JORDAN POWELL



Communicating with large IBM computers is remarkably easy with ATARI, and relatively inexpensive — at least in mainframe terms. Besides the usual required equipment you will need a modem and some special software at your end, and a device called a "protocol converter" at the IBM's end of the phone line. Of course, that means you must have some control, influence or special knowledge concerning the receiving end, but for those of you whose employers have IBM mainframes, that shouldn't be too difficult.

The problems confronted are not unlike the cultural and language barriers between two nations — a big one and a small one. The big one doesn't know the small one's language, and isn't about to learn it. The small one, in this case the ATARI has to "come up." And just because the ATARI is a real computer doesn't mean the IBM will treat it like one. In fact, it will be more readily recognized if it plays dumb, and even pretends to be a member of the family.

You probably know that the ATARI doesn't speak IBM's language. IBM speaks EBCIDIC (Extended Binary-Coded Decimal Interchange Code), and doesn't much care that nobody else does. It does realize, however, that lots of other computers speak ASCII, so it will take on a henchman to translate, when necessary, and that's mostly what the protocol converter is and does.

Unfortunately, poor cousin ATARI doesn't even speak ASCII, it speaks a dialect called ATASCII, so it has to have an interpreter too, to tell it what to say and how to say it.

The interpreter of choice at the ATARI end is the Chameleon CRT Emulator from the Atari Program Exchange. Chameleon translates ATASCII into ASCII, and makes the ATARI appear to be a well-known, if not IBM, computer terminal. It also makes the 40-column screen simulate an 80-column screen by scrolling.

Chameleon does not solve the problem entirely. We still must translate ASCII to EBCIDIC, and appear to the IBM as if we are an acceptable terminal. The protocol converter does this. Recently, the PCI Protocol Converter has become available at about $3,000, and makes the ATARI look like an IBM 3270 terminal. It also bestows some 3270 features in the bargain. Obviously, this is more than poor cousins can afford, but many mainframe owners either have installed converters, or can be cajoled into doing so. One converter can recognize up to 20 terminal types, so its usefulness extends beyond the ATARI application.

The final problem has to do with hardware, specifically modems and cables. Modems make it possible to send digital information created in

continued on next page

computers across phone lines which were meant to transmit voice data. There are two points to be made here. The first is that the modem should be at least 1200 baud (bits per second). This is because 3270 devices work in *screens* of data rather than *a line at a time*, and at speeds slower than 1200 baud, filling a screen takes forever. Still, 300 baud modems can be used if the receiving modem supports that rate. Speeds faster than 1200 baud may be possible, depending on the quality of the phone lines used.

The second point is that modems have protocols too, so make sure that the modem you have and the one at the mainframe use the same modem protocol. The modem must be a direct-connect type, which connects to your phone jack via a regular phone cord. A common modem protocol used for 1200 baud mainframe communication is the BELL 212A protocol. The U.S. Robotics Micro Link 1200 works well and is relatively inexpensive ($500).

Connecting the modem to the 850 via an ATARI cable presented a problem. While the signals coming out of the 850 interface are RS-232 standard, the positions of the pins on the modem side of the Atari cable are not in the RS-232 standard positions. I had to strip the connector off the cable and place the wires in the correct positions in a new connector. Remember, SEND-DATA from the 850 goes to RECEIVE-DATA on the modem, and vice versa.

The rules for communicating from one device to an IBM requires either Bisynch or SDLC, both foreign to most non-IBM equipment. Both of these translations were handled properly by the PCI protocol converter. This device is attached at the mainframe, between it and the modem, and "filters" all of the signals going to and from the mainframe. It can convert from ASCII to EBCIDIC and vice versa. It can also convert from IBM data-communications protocols to the asynchronous protocols used by most terminal equipment.

The protocol converter can enable asynchronous terminals, or an ATARI that looks like one, to use the IBM 3270 terminal features. We connected the ATARI with Chameleon emulating an ADM-3A terminal to the modem via the 850. We then dialed the protocol converter, which allowed us to simulate an IBM terminal and gain access, as a 3270, to the Time Sharing Option of IBM's MVS operating system.

One more warning: the protocol converter is sensitive to noise on the phone line just before you connect up, so if your Modem is a manual one try to turn it on as soon as possible before the computer answers the phone. You should consult with your modem dealer or factory technical contact about how best to do it.

PROTOCOLS

Communications protocols are becoming increasingly complex, though the idea behind them is simple: if two or more devices are going to communicate, there must be some rules. An analogy is a town meeting. If everyone spoke at once, nobody would hear anyone else; or, if two people spoke to each other at the same time, neither would hear the other. Communicating devices have the same problems, so sets of rules define the way communicating devices interact. If the devices don't all follow the same set of rules (protocols), communication is impossible.

There are many layers of protocol in data communications. The first layer is at the physical (modem) level. Fortunately, Bell modem protocols are the industry standard and most modems use them. The 212a 1200-baud protocol is the one we used. The next layer up is the datalink layer. This layer defines the method by which data elements (characters, messages) are sent and received, while the physical-layer protocols define the method by which the signals carrying the data elements are sent. Asynchronous communications means that each character is preceded by a *start bit*, which signals that a character is coming, and followed by one or more *stop bits* signalling end of character. The sender and receiver are not synchronized (clocked at the same rate in tandem). Synchronous protocols send data in larger units. The message, which could be the contents of an entire screen, is preceded by a start bit (or by start characters) and continues on until the sender appends the message-end character(s).

IBM uses synchronous protocols. The information utilities (the SOURCE, CompuServe) use Async, teletype-like protocols for communicating with micros. Programs which allow access to these services do not readily communicate with IBM mainframes unless special provisions are made at the mainframe. It may be possible to get a protocol converter to translate for these programs.

IBM uses "small" computers as front-ends to the large mainframes. These computers handle the communications tasks, allowing the mainframe to work on applications programs. There is software for such a communications computer (IBM 3705) which allows Async devices to communicate with the mainframe, but it is apparently too costly, complex and demanding of the 3705's resources for most companies to want to use it. IBM should be coming out with a new communications computer with more power and flexibility in the near future.

You will need:

Atari 800 computer
Atari 810 Disk Drive
Atari 850 Interface
Atari Modem Cable
From your local Atari dealer

Chameleon Terminal Emulator
Atari Program Exchange
P.O. Box 3705
Santa Clara, CA 95055
800-538-1862
in CA 800-672-1850

U.S. Robotics
Micro Link 1200 Modem
U.S. Robotics Inc.
1035 W. Lake St.
Chicago, IL 60607
312-733-0948

PCI Protocol Converter
(at the mainframe)
6150 Canoga Ave.
Woodland Hills, CA 91367
800-423-5904
in CA 213-716-5500

ATARI 835 MODEM & TELELINK II

by JOSEPH DECUIR

Until recently, the line of official Atari products for computer telecommunications was limited to the acoustically-coupled, model 830 Modem and the TeleLink I software program in ROM cartridge form. These required the expensive 850 Interface Module, and had other limitations.

Atari, Inc. has now introduced a new pair of communication products: the ATARI 835 Direct-Connect Modem, and the TeleLink II cartridge. Each offers substantial improvements over its predecessor, and in combination they offer Atari customers easy access to remote computer services, such as time-sharing or electronic banking.

The pair are built to work together, bypassing the 850 Interface, and neither is fully useful when teamed with non-Atari gear. In fact, at present the 835 only works with TeleLink II and is not sold without it.

HOW TO USE THEM

To appreciate these products, imagine how you might use them. Some installation effort is required, but once installed, repeated use is unusually easy. The 835 Modem is housed in a standard, tan Atari case that will stack unobtrusively with the rest of your equipment, and TeleLink II is in the familiar ROM cartridge.

The new modem attaches to the serial bus connectors, just as do the 810 Disk Drive or the 850 Interface. It can be connected and left in series with these until needed, but it should be the only modem in the group. This modem, like all other Atari components, needs and comes with an external AC power adaptor. It has two standard telephone-jack inputs — one for the telephone line, and one to daisy-chain out to your telephone. Once installed, you can still use your telephone for voice calls, but now data calls are hands-off: no more manual dialing and no more wrestling to put the receiver into the acoustic "muffs" on the modem.

You also must "set up" the TeleLink II software. (The remarkable fact is that you can!) On first use, TeleLink II will display a message: "STORED INFORMATION HAS BEEN LOST — PLEASE ENTER NEW STORED INFORMATION". Don't panic. The instructions tell you how to store the names, phone numbers, and sign-on codes of your two favorite computer services. Once set up, you only need one keystroke to dial these services and log-on. The numbers will stay there until you change them, even when you remove the cartridge from the computer. This advanced feature apparently uses the new "EEPROM" technology (Electrically-Eraseable, Programmable, Read-Only Memory).

So, with your 835 nestled neatly in your stack of other ATARI equipment, let's say you decide it's time to find out what's happening, and after that to manipulate your money. You pop Telelink II into the cartridge slot and turn the computer ON. The first display is the familiar ATARI logo. You press [RETURN] to get the main menu, and see several items. Select [1] to dial your first pre-programmed number (let's pretend it's the Dow Jones News/Retrieval Service). You hear the Modem pulse while it dials the number, and you hear the ringback through the TV speaker. When the computer answers, you hear the carrier tone briefly and "On Line" lights up on the Modem. TeleLink II then logs-on, using your preprogrammed sequence that can contain imbedded pauses, carriage returns, and control characters.

After reading the news, you log-off Dow Jones. TeleLink II will drop you back to the menu. Pressing the [2] key gets you logged-on to the next computer service (suppose it's your bank). Then you can pay bills and transfer funds, as long as your bank thinks you have the money.

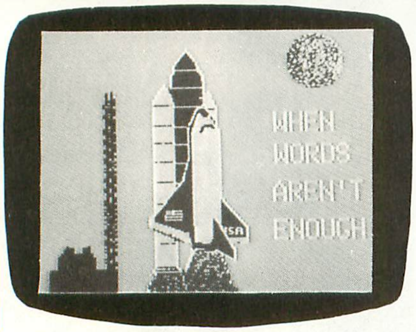
LIST OF FEATURES

As a designer of modem systems for computers, I was at first disappointed by the absence in the 835 of features

continued on page 26

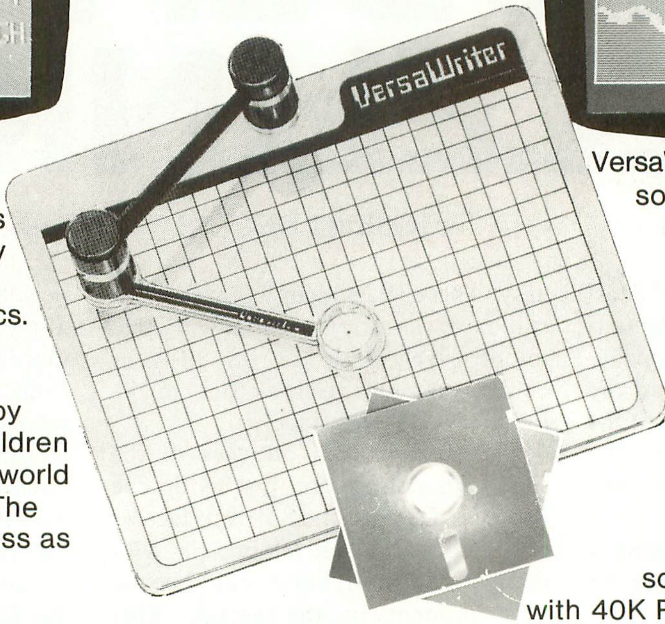
Joseph Decuir is Chief Engineer at Standard Technologies Corp., where he designs voice and data telecommunication systems. He is an Atari alumnus who shares the patent on the ANTIC chip and the ATARI 800 computer system. He was also one of the designers of the ATARI 2600 video game computer.

VersaWriter



WHEN WORDS AREN'T ENOUGH . . .

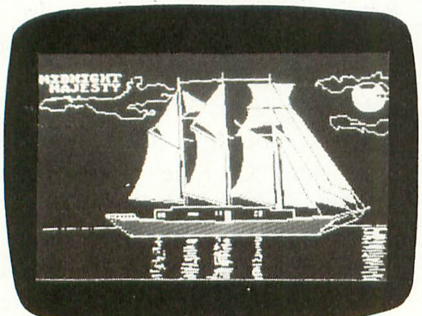


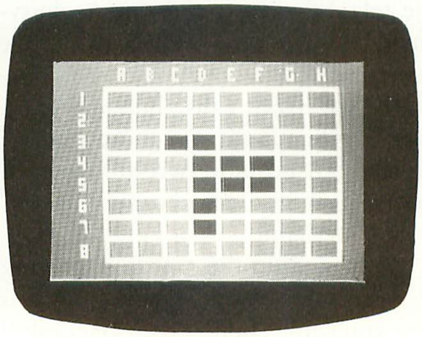


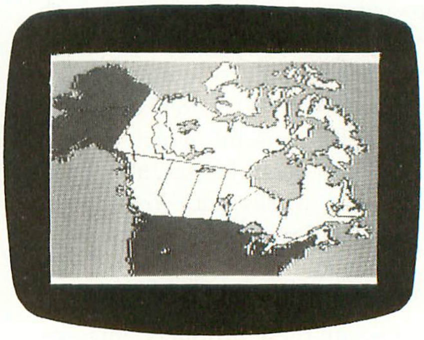
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VersaWriter contains complete software for drawing with color and brushes. Add text or fill in over 60 colors. Create your own shapes & place anywhere on the screen. Use Hi-res or Medium-res drawing, save pictures to disk, and dump to MX80 with Graftrax. Complete hardware/ software system for Atari with 40K RAM Memory - $299.00

VERSAWARE for ATARI







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Mind Bogglers contains three games designed to challenge reasoning, strategy, deduction and memory. Capture, based on the popular game Othello™, is a battle for control of the board. Find hidden atoms by shooting rays into the Mystery Box. Simon Says is a memory teaser using numbers and sound. All games offer varying degrees of skill level. Requires: Atari, 16K RAM (cassette), 24K RAM (disk).

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Test your geography skills with Globe Master. Eight high resolution maps offer drill on states, capitals, countries, continents, oceans, etc. A challenging educational program which offers four skill levels and user friendly software options reducing the importance of exact spelling. Contains two disks. Requires: Atari 800, 32K RAM, Basic Language Cartridge, disk.

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ANTIC has something special for all of you who love to explore the graphics potential of your machines.

We are sponsoring a COVER ART CONTEST, and the winner's work will be featured on our cover later this year. An inside article will show selected other entries. The contest is open to teams, for example a family, as well as individuals. The main requirement is that the design be contained in a loadable program created with the ATARI computer. Any technique can be used to make the design, and we encourage the use of products such as Micro-Painter, PAINT, Drawpic, and Versawriter. The design should *not* include the name of ANTIC, nor any of the other words we normally use on our cover.

All entries must be received on disk or tape by June 15, 1983, and will become the sole property of ANTIC. Entries should be accompanied by an explanation of how the designs were made. Send entries, with your name and address, to

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ATARI 835 MODEM and TELELINK II
continued from page 23

dear to my heart. However, I do acknowledge that those features have more to do with automatic, data-communications applications, such as computer-to-computer electronic mail. These new Atari products are aimed at home users who want to use their computer as an information utility.

The Atari 835 Direct-Connect Modem features:

1) direct connection to the telephone line, through a standard modular jack,

2) daisy-chain connection to a telephone, also through a modular jack,

3) 300 baud (30 characters per second) data communication using the Bell 103 standard protocol,

4) automatic pulse dialing under computer control,

5) audio from the phone line is fed to the TV speaker,

6) simple Atari serial-bus interfacing.

The main features of the TeleLink II cartridge are:

1) compatibility with the 835 Direct-Connect Modem, with the 830 Acoustic Modem (or any other Bell-103-standard modem) connected to an 850 Interface Module, or with a Bell-212A compatible 1200-baud modem connected to an 850,

2) non-volatile storage of the names, phone numbers, and log-on sequences of remote computer services,

3) automatic dialing and automatic log-on using the above stored information.

FEATURES ATARI LEFT OUT

You might wonder, with all these features, what else you might want. The following is my wish list, with speculation about why they are not included.

To communicate automatically between computers, for example electronic mail, at least one of the two communicating devices needs to answer the phone as well as place calls. To do this the modem needs a ring-in detector, to sense an incoming call. The 835 does not have one (unless I missed a circuit somewhere — our unit did not have documentation). To use this feature, the computer must be left running continuously, waiting for the phone to ring. This ties up your phone line, but someday I expect this will be a common practice.

The cheap, new, long-distance-telephone companies like MCI and SPRINT require a touch-tone telephone to dial ID codes and telephone numbers. The pulse dialer in the 835 can't generate tones, so this makes Bulletin Board calls more costly. However, these same long-distance services have poorer quality, which could lead to intolerable error rates in data communications. Also, the majority of the big commercial data-base services have local access numbers, avoiding direct long distance charges altogether. Finally, a tone dialer chip costs money; it might have added $25 to the retail price of the 835.

I sometimes use a modem to transfer files from my computer to somebody else's computer and vice versa. This is called uploading and downloading. I use the Chameleon program, sold by APX. For this purpose, the missing ingredient in TeleLink II is "hooks" for file-transfer capability. However, if you have files to transfer, you probably have a disk drive to hold them, and therefore can use disk-based software to transfer them. The salient feature of TeleLink II is its on-cartridge writeable storage, which makes it possible to use without a disk drive. This problem will be solved if and when a version of Chameleon can use the features of the 835.

RECOMMENDATIONS

Now it is time for the bottom line: should you buy one? My answer depends on the price, which is $275 for the combination of the ATARI 835 and the TeleLink II cartridge. A price of $150 or less for the 835 would be a good deal, and I would recommend it without hesitation. An examination of its parts indicate that it could be sold profitably for that price. At over $275, I would buy a Hayes Smartmodem (with auto-answer and auto-dial) instead, and use it with the 850 Interface I already have.

The TeleLink II cartridge itself, with the on-cart storage, is particularly useful for someone without a disk drive. It would be worthwhile at $50, but it will never be able to transfer to disk, if a drive is later obtained. It seems to me that this pair will be of most value to the owner who doesn't have an Interface or disk drive, and who just wants to check-in periodically with a couple of frequently-called services.

PHOTO FUN

Who's the mystery programmer?



The first correct answer received here by U.S. Mail wins choice of APX program. (That's a hint, mein freund!) Send to Photo Fun, c/o ANTIC, 600 18th St., San Francisco, CA 94107.

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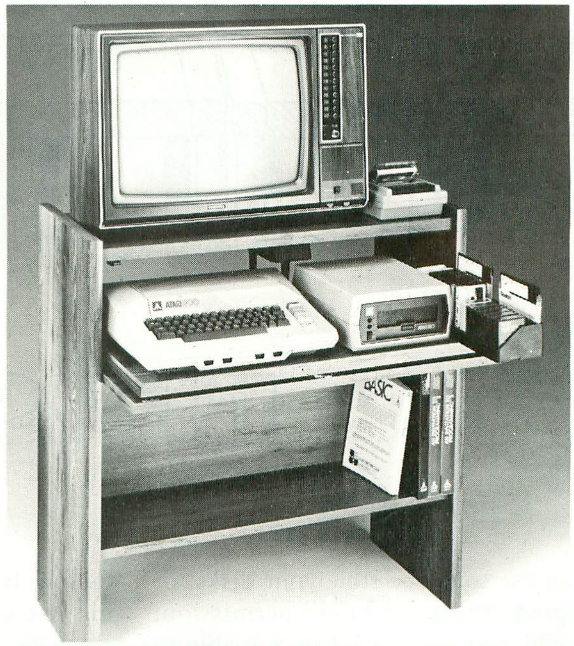
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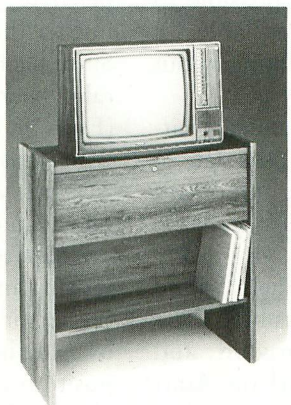
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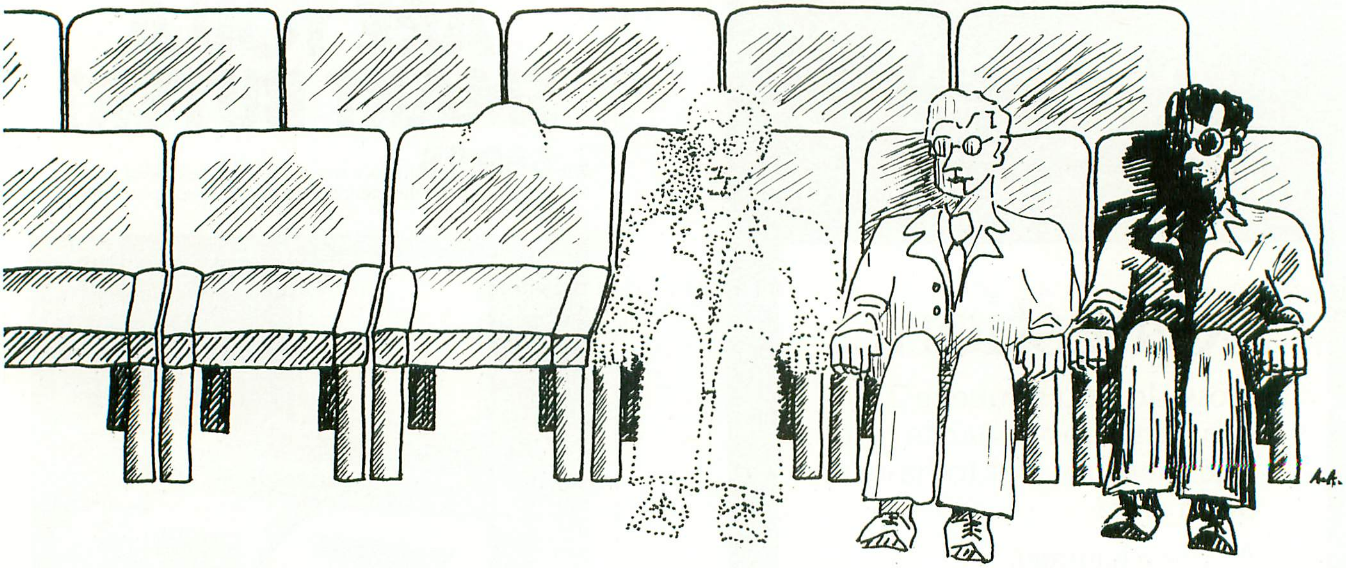
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INVISIBLE SECTOR

by CHUCK McMATH

Suppose someone stole your disks, or copied them without permission. Could you prove it? It is possible to create a permanent, secret label on your disks, and I'm not talking about invisible ink.

This label, residing on the disk itself, could hold your name, the date, a serial number, or any other important data — without using any space on the disk! It would be invisible, yet readily available to you, the owner. Sound exotic, intriguing, impossible? The fact is, it's easy, straightforward, and possible because of a quirk in Atari DOS. But first, you'll need to understand how the disk is organized.

DISK ORGANIZATION

Any disk you use is divided into 720 sectors. Each of these sectors holds 128 bytes. Theoretically, a disk could hold 90K bytes (720 sectors, times 128 bytes, divided by 1024 bytes per kilobyte). However, some of the sectors are reserved by DOS for the directory and miscellaneous disk-management tables. One of these tables is the Volume Table of Contents (VTOC). The VTOC maintains a record of which sectors on the disk are currently in use. The table is made up of 90 contiguous bytes, with each bit representing one sector (90 bytes, times 8 bits per byte, equals 720 bits, corresponding to the 720 sectors on the disk). Since each bit represents a sector, this table is referred to as a "bit map." (Each bit corresponds to one sector on the map.)

When you save a file onto disk, the File Management System (FMS) writes the data to certain sectors. Along with writing in the sector, the FMS marks the sector "used" in the VTOC, simply by placing a zero in the VTOC bit position corresponding to the written sector. This prevents the FMS from using that sector for another file (unless you delete this file, in which case the sectors are marked as "free").

So far, so good. Now for the bad news — at least from the system's point of view. From our point of view this is the *good* news! The FMS interprets all 720 bits as corresponding to sectors 0 to 719. This in itself is no problem, except that the disk drive will not accept commands for sector zero. This means that not only will sector zero in the bit map never be marked (because of the drive's limitation), but that sector 720 will not be used by the FMS, since there is no bit to represent it. Since it can't be represented in the VTOC, the FMS can never store information there!

Here's where we step in. Just because the FMS will not access this sector doesn't mean that we shouldn't (or can't). That sector is exactly where we will write our "invisible" data. Since the FMS doesn't count this sector in the first place, we will lose nothing by using it, but we will gain 128 bytes to store anything we want. For a more detailed expalanation of the VTOC and its interaction with the FMS, see Bill Wilkinson's *Inside Atari DOS*.

INVISIBLE WRITING

Unfortunately, we cannot directly read from or write to a specific sector in BASIC. Listing 1 is a short Assembly Language program that will either read from or write to sector 720. The calling sequence for this is:

```
X=USR(1536,CODE,ADR
(BUFR$))
```

where CODE is 82 (decimal) for read, and 87 for write. BUFR$ must be at least 128 bytes long, and depending on the operation, contains the data to be written or the data just read. The routine itself is not complicated; it merely sets the following parameters:

mnemonic	location (hex)	explanation
DUNIT	$301	the disk unit (usually 1)
DCOMND	$302	the command (82 = read, 87 = write with verify)
DBUF	$304–305	address of buffer (low byte, then high)
DAUX1	$30A	for these commands, sector number (low byte, then high)
DAUX2	$30B	

Next, it jumps to the DOS disk-handler routine (whose starting address is $E453), which does all of the work. These disk commands are fully explained in the *Atari Operating System User's Manual* (Chapter 5), which gives detailed examples of the necessary values for all parameters when using different disk commands.

BASIC READ–WRITE

Listing 2 is an example of a program that will access sector 720 from BASIC. This example shows a sample organization of our invisible sector that includes a label, an owner's name, a serial number, and a date. The only restriction on using sector 720 is that you only have 128 bytes to use, so you must plan wisely. In most cases, this amount of storage is not a limitation.

When the program is run, it first POKEs the Assembly routine into memory on Page Six. It then asks whether you want to read or write. For a write, it asks you for the information it wants. Then the Assembly routine is executed. One valuable location to check after performing these operations is location 771 (decimal). This contains the disk status. After the read or write, the program checks the status to make sure the operation was successful. If the value contains a 1, the operation went as planned. If the value is not a 1, the value gives the error code for the operation. Then, if the operation was a read, the program prints out what it found.

Listing 3 is an even shorter BASIC program that provides a directory of files on a disk. This is a fairly standard technique of reading the directory as a file, so I won't explain it too much. However, before listing the files on the disk, this program first reads and prints out the data from sector 720. This shows how this sector could be used to indicate ownership, or date of creation, or anything else you want. After reading the label, the directory is opened as a file, and the files in the directory are read out of this file. When you read the "FREE SECTORS" message, you know you are done, so you close the file and end.

CONCLUSION

There you have it. With very little effort, you can easily use this "invisible" sector for a hidden label or for other information. With these labels on your disks you have an undeniable claim of ownership. After all, who can erase an invisible label?

```
10 ;  ****** *********** *******
20 ;  *    DISK READ / WRITE    *
30 ;  *    ON SECTOR 720        *
40 ;  *    by Chuck McMath      *
50 ;  ****** *********** *******
60 DUNIT   = $301
70 DCOMND  = $302
80 DBUF    = $304
90 DAUX1   = $30A
0100 DAUX2   = $30B
0110 DSKINV  = $E453
0120 *= $600          ; START ON PAGE 6
0130  PLA             ; # OF ARGS.
0140  PLA
0150  PLA             ; GET COMMAND
0160  STA DCOMND      ; AND STORE
0170  PLA             ; GET BUFFER
0180  STA DBUF+1      ; ADDRESS AND
0190  PLA             ; STORE IT
0200  STA DBUF
0210  LDA #1          ; OPERATE ON
0220  STA DUNIT       ;    UNIT 1
0230  LDA #208        ; SET FOR
0240  STA DAUX1       ; SECTOR
0250  LDA #2          ;    720
0260  STA DAUX2
0270  JSR DSKINV      ; DISK HANDLER
0280  RTS             ; BACK TO BASIC
0290  .END
```

```
1 REM  ******************
2 REM  *   READ OR WRITE TO SECTOR   *
3 REM  *       720       *
4 REM  *   Chuck McMath  *
5 REM  ******************
6 DIM BUFR$(128),A$(1),DATE$(8),PERSON$(40),SERNO$(5)
10 FOR I=0 TO 32:READ A:POKE 1536+I,A:NEXT I
20 GRAPHICS 0:POKE 752,1:? "↖":? :? "  (R)EAD OR (W)RITE ";:INPUT A$
22 BUFR$(1)=" ":BUFR$(128)=" ":BUFR$(2)=BUFR$:DATE$="        "
25 CODE=0
30 IF A$="R" THEN CODE=82
40 IF A$="W" THEN CODE=87:POKE 752,0
50 IF CODE=0 THEN 20
55 IF A$="R" THEN 80
60 PRINT " ENTER LABEL (40 CHARS MAX)":? " ----+----+----+----+----+----+----+
   :INPUT" BUFR$
65 PRINT " ENTER YOUR NAME :";:INPUT PERSON$
70 PRINT " ENTER DATE ( as 'MM/DD/YY' ) ";:INPUT DATE$
75 PRINT " ENTER DISC SERIAL NUMBER ( 5 DIGITS)        ";:INPUT SERNO$
80 BUFR$(36,75)=PERSON$:BUFR$(121,128)=DATE$:BUFR$(76,80)=SERNO$
85 X=USR(1536,CODE,ADR(BUFR$))
90 IF PEEK(771)=1 THEN ? " DISC STATUS = OK"
100 IF PEEK(771)<>1 THEN ? " DISK STATUS NOT OK. ERROR CODE =";PEEK(771)
110 IF A$<>"R" THEN END
```

continued on page 30

```
120 PRINT
    " L A B E L        :":
    ? :? BUFR$(1,35):? :?
    " I N I T I A L I Z E D   :":
    ? :? BUFR$(121,128)
130 ? :PRINT
    " B Y              :":
    ? :? BUFR$(36,75)
140 ? :?
    " S E R I A L
    N U M B E R :":
    ? :? BUFR$(76,80)
150 END
200 DATA 104,104,104,141,2,
    3,104,141,5,3,104,141,4,
    3,169,1,141,1,3,169,208,
    141,10,3,169,2,141,11,
    3,32,83,228,96
201 REM
```

```
  1 REM ******************
  2 REM *     DIRECTORY
              WITH HIDDEN    *
  3 REM *
  4 REM *   by Chuck McMath   *
  5 REM ******************
  6 REM LINES 15-99 -
  7 REM ASSEMBLY ROUTINE TO
    READ SECT. 720
 10 DIM BUFR$(128),R$(20):
    POKE 752,1
 15 FOR I=0 TO 32:READ A:
    POKE 1536+I,A:NEXT I
 20 BUFR$(1)=" ":BUFR$(128)
    =" ":BUFR$(2)=BUFR$
 25 X=USR(1536,82,ADR(BUFR$))
 99 DATA 104,104,104,141,2,
    3,104,141,5,3,104,141,4,3,
    169,1,141,1,3,169,208,141,10,
    3,169,2,141,11,3,32,
    83,228,96
100 REM BEGIN MAIN
    DIRECTORY PROGRAM
101 REM OPEN AND READ
    DIRECTORY ON DISK AS
    A FILE UNTIL AT END.
105 GRAPHICS 0:? "↖
     D I R E C T O R Y "
110 ? "---------
    ----------":
    ? BUFR$(1,35):
    ? BUFR$(36,70):
    ? BUFR$(121,128);
    "  # ";BUFR$(76,80)
115 ? :?
    " F I L E     E X T  S I Z E ":
    ? "------------
    -----"
120 OPEN #1,6,0,"D:*.*"
125 INPUT #1,R$:IF R$(5,16)=
    "FREE SECTORS" THEN 135
130 PRINT R$:GOTO 125
135 PRINT R$:CLOSE #1
150 POKE 752,0:END
```

If you own an ATARI 800/400, you've discovered that you can run ATARI's educational software and that you can run great games. But you may have also discovered its limitations. How'd you like to keep the ATARI 800/400 and the software you have and add double density to your system? How'd you like to go beyond that to have the popular CP/M operating system, a DOS that has thousands of application programs written for it because it is the DOS that most Z80 microcomputers use? You can have all of this by interfacing your ATARI 800/400 to:

THE ATR8000

The ATR8000 is a 4MHz, Z80-based computer specifically designed to be hardware and software versatile. It comes in two models, a 16k RAM model for single and double density (OS/A+) ATARI operation and a 64k RAM model that includes CP/M 2.2 and also runs single and double density ATARI DOSes. Both models have a parallel PRINTER port, a RS-232 port, a FLOPPY DISK port that runs up to four standard disk drives, and a PERIPHERAL OUT port for connecting ATARI peripherals.

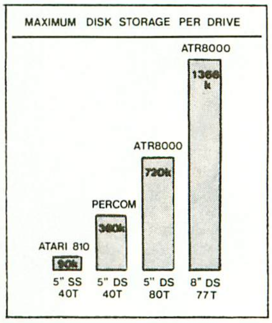
The FLOPPY DISK port of the ATR8000 runs up to four disk drives. Drives can be any mixture of size (5¼" or 8"), density (single, double or quad) and type (single or double-sided). With the ATARI 800/400 and an ATARI 810 drive, users get a maximum of 90k bytes of disk storage per drive. With the ATR8000, 5¼" drive users can run double-sided, double density drives and get up to 720k bytes of disk storage per drive—**8 times the storage of one ATARI 810.** With the ATR8000, users can run 8" drives. One double-sided, double density 8" drive can have up to 1366k bytes of storage—**over 15 times the storage of one ATARI 810.** To run OS/A+ or CP/M, the ATR8000 must have at least one standard 5¼" or 8" drive. ATARI 810 drives may be used with the system, but only for single density ATARI operation.

The PRINTER port of the ATR8000 is a parallel port. There is a RS-232 port which runs a serial printer or a modem. The RS-232 port can also be used to communicate with another terminal. ATARI peripherals, like ATARI 810 drives, are connected at the PERIPHERAL OUT port. The ATARI 800/400 connects to the ATR8000 at the COMPUTER IN port. A RS-232 terminal can be connected at COMPUTER IN in place of the ATARI 800/400 (64k model only).

The ATR8000 has an automatic printer buffer to free the computer during ATARI DOS and OS/A+ printing. 16k ATR8000s have a 4k buffer; 64k ATR8000s have a 48k buffer. Included in the ATR8000 manual are listings of two ATARI BASIC programs: SERDRV.BAS and ATRMON.BAS. SERDRV.BAS is a serial printer driver for ATARI DOS and OS/A+. ATRMON.BAS emulates the ATR8000's monitor.

CP/M disks from several other Z80, CP/M computers can be used with the ATR8000. It accepts Osborne, Cromemco, Kaypro, Xerox 820, Bigboard and TRS80 CP/M disks. The ATR8000's double density CP/M 2.2 includes the following Software Publishers programs: DDINIT, a disk initialization program with several format options; DDSYSGEN, a program for reading, writing and customizing double density system tracks; DDCOPY, a double density program for making backups; DISKMON, a program that allows primitive disk access; MODEM7, a program to run the D. C. Hayes Smart Modem from the RS-232 port; and DISKDEF, a program for defining CP/M disk parameters.

High quality disk drives in ventilated, custom enclosures and interface cables are also available.



All figures are of 2-15-83.

OPERATING SYSTEMS

	ATARI DOS 2.0	OS/A + 4.0	CP/M 2.2	CP/M-8	MSDOS[1]
ATR8000	x	x	x	x	x
ATARI 810	x	NO	NO	NO	NO
PERCOM	x	x	NO	NO	NO

[1] WITH SWP'S CO-POWER-88

DISK INTERFACES: A COMPARISON

	SINGLE DENSITY	DOUBLE DENSITY	RUNS 5 1/4" DRIVES	RUNS 8" DRIVES	RUNS 5 1/4" & 8" DRIVE SIMULTANEOUSLY	PARALLEL PORT	SERIAL PORT	INTERFACES WITH AN 80 COLUMN TERMINAL	16 BIT PROCESSOR	STAND ALONE COMPUTER	RUNS CP/M
ATR8000	x	x	x	x	x	x	x	x	EXTRA[3]	x	x
ATARI 810	x	NO	x[1]	NO	NO	EXTRA[2]	EXTRA[2]	NO	NO	NO	NO
PERCOM	x	x	x	NO	NO	EXTRA[2]	EXTRA[2]	NO	NO	NO	NO

[1] ATARI 810 DRIVES ONLY
[2] WITH AN ATARI 850
[3] WITH SWP's CO-POWER-88

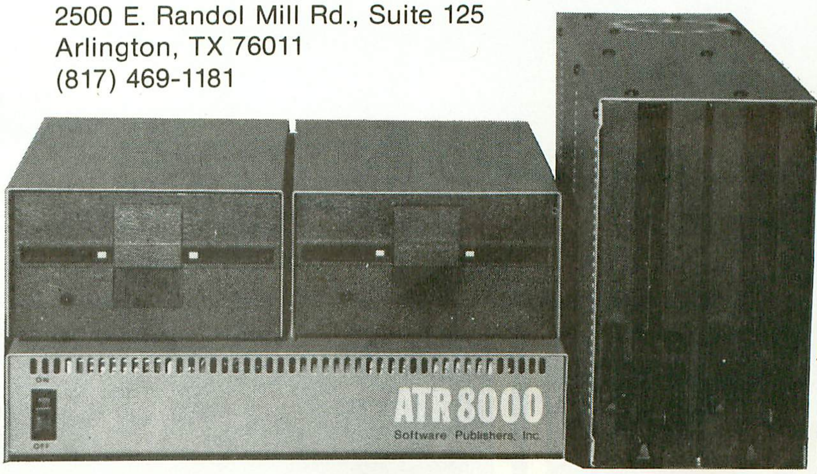
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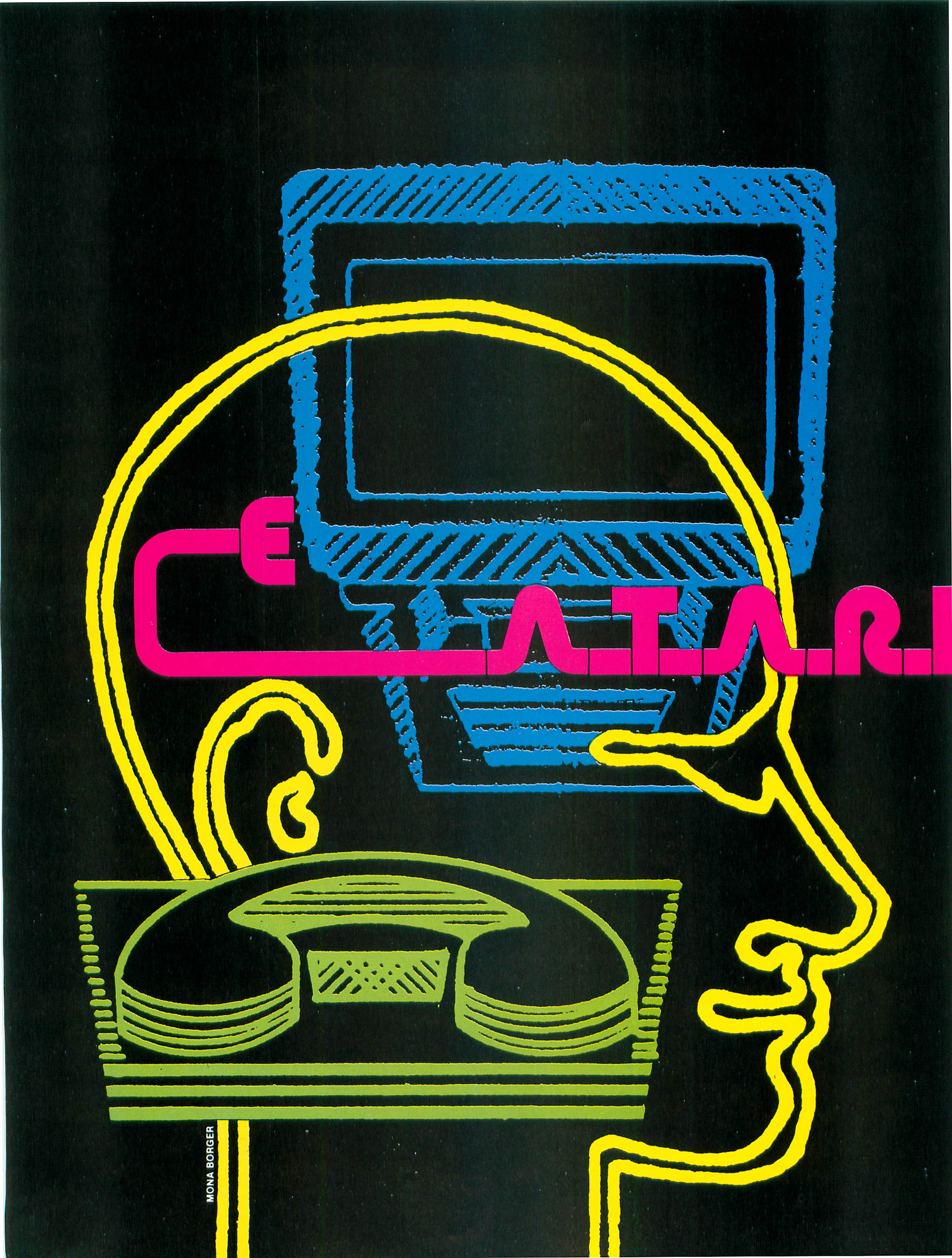
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MONA BORGER

TERMINAL

by WILLIAM HOUGH

Once you have become familiar with the operation of your ATARI home computer, you may find the world of data communications is a fascinating and rewarding avenue to explore. I chose the ATARI because of its ability to serve as a remote data terminal with features not found in competitive home computers, such as built-in lower case. I found that, with the addition of some relatively inexpensive peripherals and software, my ATARI can behave as a very fine terminal.

My initial objective was to access a mini at the office, using my ATARI at home, for work-related purposes. But it wasn't long until I discovered that I had ready access, at no cost other than telephone charges, to a variety of what are called computer bulletin boards. These are systems provided by users groups, dealers, and other hobbyists that offer free file space for messages, want ads, questions, answers, phone numbers for other bulletin boards, and public-domain software. A growing number of bulletin boards are devoted to ATARI enthusiasts. There are also commercial servcies, such as CompuServe, the Source, and Dow Jones, that provide large data bases and charge for usage.

This article provides a short overview of data communications, describes the peripherals needed to explore this field, and gives my views on two very fine public-domain programs that will turn your ATARI into quite a smart terminal. Also, you will find a listing and instructions for a short BASIC program that will allow even a novice to start communicating with bulletin boards.

Basically, there are three pieces involved in data communications: a computer, a terminal, and a telecommunications channel.

Basically, there are three pieces involved in data communications: a computer, a terminal, and a telecommunications channel. In this context, the computer is the machine that is doing the data processing, and it is often called the *host* computer, or just the host. The terminal is the system's human interface — a keyboard and display screen or printer — from which the user inputs instructions to the host and obtains output generated by the host.

Think of your ATARI as a terminal, and a bulletin-board system as a host. The public telephone network serves as the connecting channel. Your ATARI can also serve as a host. With the appropriate software and hardware, it can *be* the bulletin board system, and other hobbyists will begin calling your ATARI.

A MODEM IS A MUST

You will need a modem to enter the world of data communications. "Modem" is a contraction of modulator / demodulator. The function of a modem is to transform the low-voltage, digital, data signals from the computer (or terminal) into an analog signal that can be transmitted and received over voice telephone lines. There is a wide choice of modems available, and you need to pay attention to four things: 1) how they connect to the ATARI, 2) how they connect to the telephone network, 3) the speed at which they transmit and receive data, and 4) extra features.

Most modems use an industry standard interface to the terminal or com-

---

Bill Hough is an engineer with degrees from Northwestern and Stanford, and has been with the Bell System for 17 years. Mastering the ATARI is a principal leisure-time activity. He is the author of a logical game called "Brainboggler," available through Educational Software, Inc., and is working on a program to analyze stock option strategies with the ATARI.

puter. The interface specification was developed by the Electronic Industries Association, which named it RS-232-C. Connector pin assignments, signal directions, and voltage levels are specified for a 25-pin connector that comes with the modem. To use an RS-232-C interface, you must also have the ATARI 850 Interface Module (or a functional equivalent).

The alternative is a relatively new modem that plugs into a joystick port. Special software comes with it for operation through the joystick interface. The public-domain terminal software described later won't work with a joystick-port modem. While I admire the folks at Microbits who figured out how to drive a modem through a joystick port, and realize that you can save money with this modem, when compared with the combination of the Interface Module and an RS-232-C modem, there is no flexibility to upgrade the modem or add an 80-column printer later on. My personal preferences lean toward the RS-232-C standard, which means the 850.

Three types of connections to the telephone network are available. These are acoustically-coupled, direct-connect, and what I call a hybrid. An acoustic coupler has two cups in which you place the telephone handset after establishing a call to the host. Make sure you have an ordinary phone, as dial-in-handset and designer models won't fit. A direct-connect modem has a cord that plugs into the same miniature jack on the wall as does a modular telephone. Once the call is established, the telephone is not needed. The hybrid is another clever device that connects in series with the handset of a standard phone. To use it, the coiled handset cord on your telephone must have miniature plugs so you can unplug the cord, insert the hybrid modem, and reconnect the handset to it. Dial-in-handset phones won't work with the hybrid modem either.

The hybrid modem and most acoustic couplers are less expensive than the direct-connect type, because the internal network in the telephone is used to do part of the transmission job. The direct-connect type should be more reliable than an acoustic coupler, as it is not subject to interference from room noise, computer buzzers, and bells. By law, a direct-connect modem cannot be used on a party line, but you don't want to try data communications on a party line anyway. The Microbits joystick modem is a direct-connect variety. RS-232-C modems are either acoustic couplers or direct-connects, with a large variety of each available.

The hybrid modem I have tried (the Anchor Automation Signalman Mark II) is RS-232-C like. The Mark II is specially made for the ATARI, and comes with a cord that plugs into an 850 Interface Module serial port. It does not have an RS-232-C connector as such, a major disadvantage if you have need for it with a terminal other than the ATARI.

Speed is the next parameter. Realistically, there are only two transfer rates of interest. These are 300 bps (bits per second) and 1200 bps. (Although many people, including modem and computer manufacturers like Atari, use the word "baud" interchangeably with "bits per second", this usage is technically incorrect.)

The higher the speed, the more complex the modulation technique needed to transmit data over a telephone connection intended for relatively low-frequency speech. At 300 bps, a set of two audio tones, one that represents the bit-state 0 and the other the bit-state 1, is used for direction of transmission. Another set of two tones is used for the opposite direction. This is the reason for originate/answer switches on modems. Each end needs to know which it is so it will send the tone pair that the other is listening for. In terminal/host applications, the terminal end is the originate and the computer end is the answer end, by logical convention. But if you are going to talk to a friend's ATARI (not a bulletin board) with your ATARI, you have to agree beforehand who is which. At 1200 bps, a more complicated modulation technique is necessary, and 1200 bps modems are consequently about two-to-three times more expensive than 300 bps modems with equivalent features.

A 300 bps modem is said to be Bell-103 compatible, and the most common type of 1200 bps modem is called a 212 or 212A. These designations come from the names of the Bell System modems that use the standard modulation techniques. To my knowledge, all 212A modems operate at 300 bps with the flick of a switch. So if you get a 212A, you can still talk to bulletin boards that have only 300 bps capability.

The hybrid modem and most acoustic couplers are less expensive than the direct-connect type, because the internal network in the telephone is used to do part of the transmission job.

A couple of more words about speed. There is nothing fundamental in a 300 bps modem that limits it to 300 bps. Within limits that I don't know, it will send out tones as fast as a terminal or computer can feed it bits. So if you have a nearby friend and a good telephone connection, you might, by prior mutual agreement and Atari software option settings, try to operate a 300 bps modem at 600 bps.

Many modems have another switch labeled half-duplex/full-duplex. Half-duplex means that at any given time, transmission is only in one direction. Full-duplex implies both directions simultaneously. As you type at a host computer from a terminal, the host will usually echo what you type so you can see both halves of the conversation. This requires full-duplex transmission. If you set your modem at half-duplex, it will echo the characters rather than depending on the host to do so. But if you forget to tell the host

you are working half-duplex, it will also echo the characters, and the effect will be ttwwoo cchhaarraacctteerrss on your screen for every one you type. You will probably never need half-duplex when talking to a host.

Other features you might use are automatic answer (necessary if you are a bulletin board) and automatic dialing. These fancy features are available only in some direct-connect modems, so you can't be a bulletin board with an acoustic modem.

Basically, it's like choosing a home computer; you have to trade off features and capabilities against cost. Don't forget that higher speed means lower phone bills if your calls are toll calls. If you're wondering where the Atari 830 fits into all this, it's an acoustic coupler with a standard RS-232-C connector, an originate / answer switch, and a full / half-duplex switch.

THE 850 INTERFACE MODULE

The Interface Module does just what its name implies. It interfaces the Atari peripheral port to four serial ports and a single Centronics parallel port. A serial interface or port puts the bits that represent a character, plus other signaling bits, in *series* on one wire for each direction of transmission. Remembering the modem modulation techniques, it should be obvious that a series of bits, in time, is necessary when a data signal is to be transmitted over the telephone network. A parallel interface or port puts each bit of the character code on a separate, *parallel* wire. The parallel port on the Interface is intended for a printer that operates according to the Centronics parallel interface standard. This parallel interface is one-way. Characters go only to the printer, not the other way. In both the serial and parallel interfaces, additional wires carry control signals back and forth.

The serial ports on the Interface Module do not conform to the RS-232-C standard for terminals.

The serial ports on the Interface Module do not conform to the RS-232-C standard for terminals in that the physical connector and pin assignments are different. Therefore a special cable is necessary to connect to an RS-232-C modem. Atari supplies one (the same one that comes with the 830), but it is relatively expensive. If you have a wire stripper and a small soldering iron, building a cable to connect to any RS-232-C modem is straightforward. If you don't, consider buying these tools, as you'll probably still save money. You will need a DB-9 male plug for the Interface Module end and a DB-25 male plug for the modem end. You'll also need a short piece of cable with at least eight individual conductors, and the following table of pin-to-pin connections.

There is no fine line between "dumb" terminals and "smart" terminals.

MODEL CABLE

IM Pin	Function	Modem Pin
1	DTR	20
2	CRX	8
3	XMT	2
4	RCV	3
5	Ground	7
6	DSR	6
7	RTS	4
8	CTS	5

SOFTWARE MAKES YOUR TERMINAL SMART

Once you have the hardware, you will need a program to instruct the ATARI to act as a terminal. The program provides your ATARI "terminal" with its capabilities. Atari's Telelink cartridge is an example of terminal software.

There is no fine line between "dumb" terminals and "smart" terminals. The dumbest dumb terminal does nothing more than deliver what you type to the telecommunications network, and receive and display what the host sends back. The more features and functions done locally, the smarter the terminal. For example, the smart terminal programs available in the public domain are capable of capturing the conversation on magnetic media, either cassette tape or floppy disk.

Unless your ATARI is talking to another ATARI, the terminal software must have the ability to do some translations between standard ASCII code and Atari's version, which they call ATASCII. ASCII stands for American Standard Code for Information Interchange. It is an eight-bit code, but one of the bits is reserved for parity, which, if used, provides an internal check on the integrity of the information bits. (Since parity is optional, some call ASCII a seven-bit code.) Seven bits can be put together in 2^7, or 128 ways. Therefore, there are 128 characters in the ASCII character set.

ATASCII, on the other hand, is an eight-bit code where all bits are information bits. The ATASCII code contains 2^8 or 256 characters. Since the ATARI is an eight-bit microprocessor, why not? The ATASCII code is printed in the Atari BASIC Manual. On the TV display, the extras are used for graphics and inverse video characters. They are also quite handy for coding machine language subroutines as strings of characters. Any eight-bit instruction for the 6502 can be represented by a single ATASCII character. However, some of the ASCII control codes needed in data communications do not have functional equivalents in ATASCII. The most troublesome example is that the ATARI end-of-line character [RETURN] is decimal 155 in ATASCII, and the ASCII equivalent is a carriage return (decimal 13) followed by a line feed (decimal 10).

Atari's Telelink cartridge does provide these characters. Not only are they accessible from the keyboard, they display properly on the screen.

continued on page 92

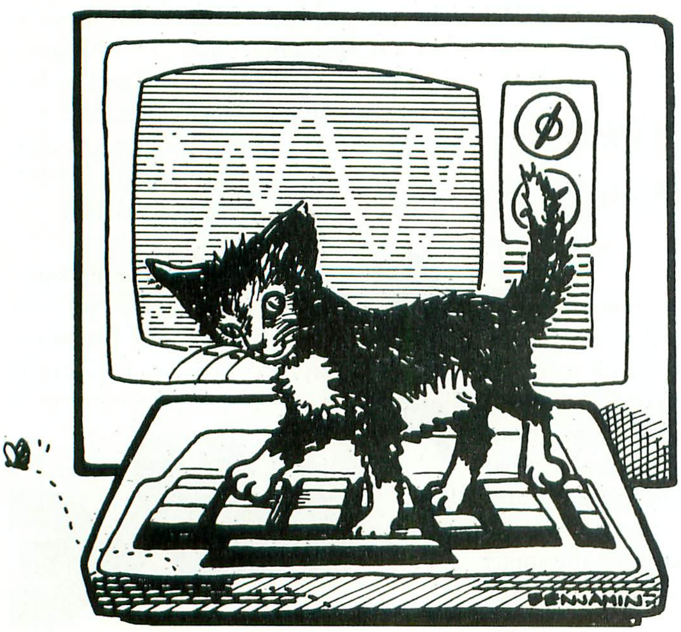
IDIOTPROOFING YOUR KEYBOARD

by JERRY WHITE

Please don't be offended by the word idiotproof. I use it innocently so as not to offend anyone by using the word foolproof. But seriously folks, using an INPUT command for keyboard input is not completely reliable, and can create problems.

Here's an example. You are playing a game with a friend. The game program has dimensioned strings and is now at an INPUT NAME$ command. Player #1 types his name and presses the RETURN key. So far, so good. As player #2 begins to enter his name, the first player discovers that he pressed a wrong key, and decides to make a correction. He interrupts player #2 and uses the CTRL-ARROW keys to reposition the cursor. Then he goes to delete a character using the CTRL-DELETE BACK S, and presses CTRL-CLEAR by mistake. What we have here is a problem.

One way to avoid this kind of problem is to avoid using the INPUT command. You should replace it with a routine to examine each keystroke individually, and accept only the ones you need. In most cases, such a routine should not accept any CTRL characters, lowercase characters, or inverse video. Writing this type of routine is not simple, so I'll save you considerable time and effort by sharing my idiotproofing routine with you.



The required subroutine begins at line 12, ends at line 28, and uses 440 bytes of RAM. At line 10, we issue the usual GRAPHICS 0 command and OPEN IOCB #1 for keyboard input. You may use a different IOCB number if you like, but be sure you also change the IOCB # in the GET command in line 18.

I did not disable the [BREAK] key in this demonstration program. This will be necessary, and can easily be done by inserting two pokes between the GRAPHICS 0 and OPEN commands. Insert POKE 16,64:POKE 53774,112.

The GOTO 30 at the end of line 10 neatly bypasses our subroutine and brings us to the introduction, which is followed by an input prompt. Note that this input prompt is not idiotproofed, so go ahead and clear the screen if you like. What we need here is the maximum length of the input as required by your program so that we can dimension our string accordingly.

For purposes of demonstration, you will now be asked to enter your name. But instead of using an input statement, we GOSUB 12.

The pokes in line 12 insure uppercase, normal video, and null any previously pressed keys. SP is used as a String Position counter.

At line 14 we store the last key pressed in the variable KEY, and loop until we get something acceptable.

At line 16 we check to see if our string position counter is 0, and if the last key pressed was [DELETE BACK SPACE]. If so, we go back to line 12.

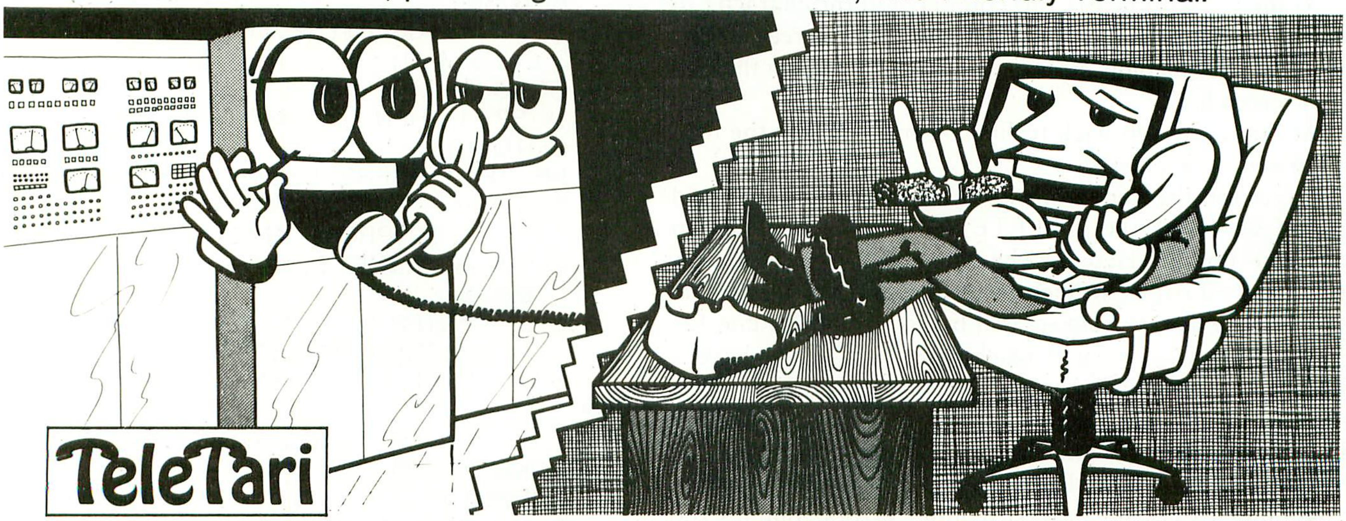
At line 18 we have decided to accept the key, and store it as the variable AV by using a GET command. By doing this, we get the ASCII Value. In the same line, we must again check to see if we have the [DELETE] key, and skip ahead to line 26 if this is true.

At line 20 we check to see if we have the [RETURN] key or if the current string position is at the maximum. In either case we print the return character, and RETURN or exit

continued on page 38

DON'T ASK PROVIDES THE MISSING LINKS

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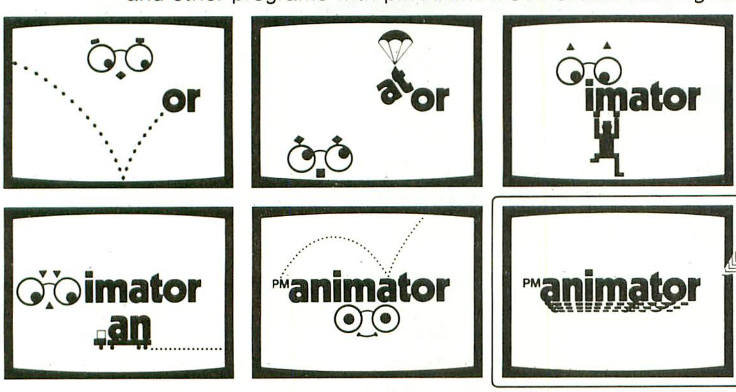
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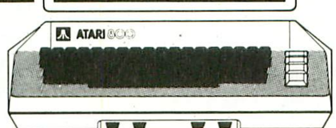


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IDIOTPROOFING YOUR KEYBOARD

continued from page 36

this subroutine.

At line 22 we add 1 to our counter, add the character to our string, and display the character on the screen. Don't forget that semicolon, because we want to stay on the current screen line.

At line 24 we go back to line 14 and wait for the next valid key to be pressed.

To refresh the human memory, back in line 18 we said that if we found the [DELETE] SP key, we should skip ahead to line 26. Here we check to see if your counter is equal to 1. If so, we will let the [DELETE] key perform its function, and start from scratch by going back to line 12.

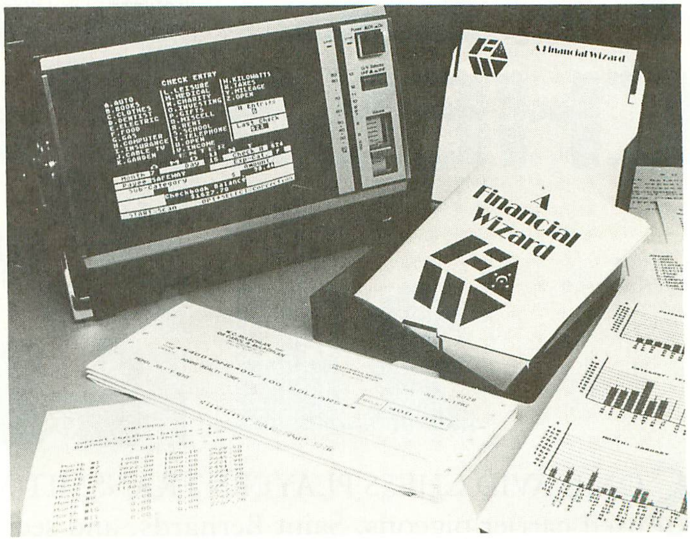
The only way we will reach line 28 is if we have a [DELETE] and our counter is greater than 1. In this case we decrement the counter, make our string one position shorter, let [DELETE] do its thing, and go back to line 14.

That may seem like a lot of work just to avoid the remote possibility to certain keyboard input errors, but it's the price you have to pay for this type of human engineering. If you have a better way, please share it with us.

```
10 GRAPHICS 0:OPEN #1,4,0,"K:":GOTO 30
12 POKE 702,64:POKE 694,0:
   POKE 764,255:SP=0
14 KEY=PEEK(764):IF KEY=39 OR KEY=44 OR
   KEY=60 OR KEY>63 THEN 14
16 IF SP=0 AND KEY=52 THEN 12
18 GET #1,AV:IF KEY=52 THEN 26
20 IF AV=155 OR SP=MAX THEN ? CHR$(155):
   RETURN
22 SP=SP+1:USER$(SP,SP)=CHR$(AV):
   ? CHR$(AV);
24 GOTO 14
26 IF SP=1 THEN USER$="":? CHR$(AV);:
   GOTO 12
28 SP=SP-1:USER$=USER$(1,SP):? CHR$(AV);:
   GOTO 14
30 ? :? "IDIOTPROOF KEYBOARD
   INPUT ROUTINE":? :? ,
   " by Jerry White"
31 ? :? "ENTER MAXIMUM INPUT LENGTH";:
   TRAP 31:INPUT MAX:TRAP 40000:
   MAX=INT(MAX):IF MAX<1 THEN 31
32 DIM USER$(MAX)
40 ? :? "ENTER YOUR NAME?";:GOSUB 12:
   POKE 764,255
42 ? "USER$=";USER$:LIST 50,57:? :
   ? "BASIC":? "IS";:END
50 REM KEY=last key pressed
51 REM AV=ATASCII value
52 REM SP=string position
53 REM USER$=user input string
55 REM This routine masks out
56 REM lowercase, inverse video,
57 REM and control characters.
```

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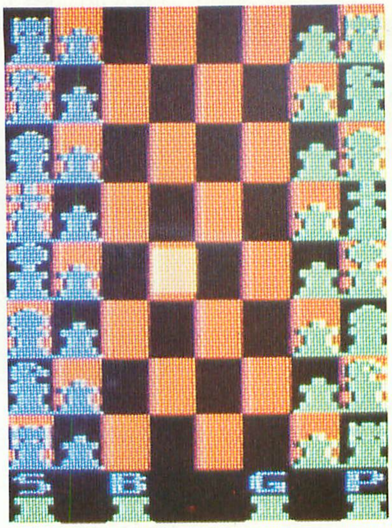
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TELE CHESS



by THOMAS McNAMEE
and PETE GOODEVE

SOME AVID CHESS PLAYERS TRANSMIT MOVES BY MAIL. OTHERS HAVE PROBABLY used carrier pigeons, Saint Bernards, and secret agents. We believe that this program is the first time that truly-interactive chess has been played on ATARIs hooked up for data communication.

This collaborative coup began with the colorful game board and housekeeping program submitted by Thomas McNamee. He designed the black and red playing area, the blue and green chessmen, and the method of moving them with a cursor controlled by a joystick. He did not program the computer to play, but only to support two human players.

It dawned on us that it would be appropriate for this, our communications issue, to further develop the game so that the players could be remote and play each other over the phone lines. This meant that somehow each player would have the current board displayed, and that the consequences of moves would be transmitted back and forth.

Pete Goodeve, an inveterate programmer recently intrigued by the communications potential of the ATARI, undertook the project and added routines to transmit the moves, as well as text messages between the players. He tested and refined the program with the help of David Duberman, ANTIC's Technical Assistant, who wrote up the instructions for the connections and other transmission details. His work has been merged with McNamee's instructions on playing the game.

Tele-Chess is not a polished product, and users may encounter problems we did not. Still, the program should work between two ATARIs connected by modems over the phone. If you do have problems, your own efforts to solve them will be appreciated, and your solutions will be welcome here. We will write a follow-up article summarizing enhancements and your other experiences. Please send this information by mail, since we are not staffed well enough to handle the high volume of telephone inquiries this project is likely to generate.

—ANTICED

continued on page 43



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TELECHESS *continued from page 40*

This program allows two players to play chess with each other over a remote phone connection using their ATARI computers. Both computers must be equipped with a minimum of 16K RAM and a modem (with or without the 850 Interface, as required by the modem). A joystick for each player is necessary for game play.

IMPORTANT: read through this entire article before attempting any of the steps.

Each player must enter the BASIC listing. Do this by typing it in. Use TYPO to verify correctness. Save the program to tape or disk. Or, once entered by one player, the program can be transmitted by phone to the other party. Enter by hand if your data-communications skills are not yet that sharp.

Note that the program itself includes a checksum feature for the DATA statements. If you get an "INCORRECT DATA STATEMENT" message, one of the DATA lines has not been entered properly.

Before you RUN the program, make sure your 850 interface is turned on and the RS-232 handler is booted. For disk systems, an RS-232 handler is part of the AUTORUN.SYS file included in your Atari DOS Master Disk, and it loads automatically when booted. If your system is cassette-based, the RS-232 handler boots itself if the 850 is turned on *before* the computer. When the program is up and running, it should initialize, display the chessboard with all the pieces, and print a menu at the bottom of the screen.

At the top of the screen, the sides are shown as "BLACK" and "WHITE" (really blue and green). An arrow in the center of this line shows whose turn it is. The cursor is displayed as a solid pink square, almost covering a chessboard square. The cursor is moved with a joystick attached to Port One. As the cursor moves, it will pass over the board and under the playing pieces.

In order to move pieces, you must be on-line to another computer running the same program; but before you establish the connection, both players must LOAD and RUN the program on their ATARIs. Then, by prior agreement, one person sets his modem to *originate* and the other sets his to *answer* mode, and both should be set to *full-duplex*.

Establish voice contact by phone, determine who will move first, and then attach the phones to the modems. The modem in originate mode should be hooked up first. If you don't have an originate / answer switch on your modem, the modem can probably do both (e.g. Anchor Signalman direct-connect modem).

Upon attaching the modems, one of you should attempt to send a message via the keyboard to determine whether contact has been established. If you press any key, you'll see an INPUT prompt (?) appear. Continue typing, press RETURN after finishing the message, and it will be transmitted. Don't attempt to send a single message of over 30 characters, or the remainder will be truncated. Messages may be sent in this way at any time during the game, even if your opponent is moving a piece.

To move a piece, place the cursor under the piece and press the fire button. The cursor will turn white, indicating a move is in progress. Move the cursor to the destination square, and press the button again. The piece will relocate to that square. The move, though not the cursor, will be transmitted to your opponent's screen.

No check is made in this program for illegal chess moves. If you change your mind about moving a piece after it has been selected, move the cursor back to the original square and press the button. The cursor will turn pink again, and it will still be your move.

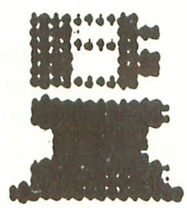
Both players alternate moves using a joystick in Port One. When a move is completed, the arrow at top changes on both screens, pointing to the other player. Captures are made when the destination square of a piece already contains an enemy piece. The captured piece is removed from the board(s), and placed off to the side belonging to the captor. You cannot capture your own piece.

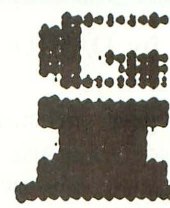
The cursor is limited to the board areas only, except for the bottom row, where the letters **S**, **B**, **G** and **P** are printed. These are playing options, and are described in the menu at the bottom of the screen. This menu scrolls up and out of sight when you transmit text messages. To select an option, place the cursor over one of these letters and press the button. The actions of these options are as follows:

S — Set-up Mode. This allows either player to set any piece at any position on the board, or to remove any piece. The cursor turns dark blue when in this mode. Move the cursor to the destination square, and press the fire button to cycle through the pieces until the one you want appears on that square. Note that one of these selections is a blank space, used for removing pieces from the board. If one player attempts this option while on-line, it's important that the other player *not* attempt a move at the same time, or the board could become out of sync. Note that the arrow at top does not flip after a Set-up to indicate a new move. It's best not to attempt a Set-up during a game until you've become fairly familiar with the program. To return to the game, move the cursor to

continued on page 98







NOT JUST A PRETTY FACE



by DAVID DUBERMAN

Traditionally, program listings in computer magazines have frustrated readers because of poor-quality reproduction. Listings are usually photocopies of dot-matrix printouts. Legibility generally is not high to begin with, and deteriorates further on reproduction.

A look at the program listings in this month's ANTIC will reveal that our new typeset listings are remarkably easier to read than the dot-matrix type. Also note that programs containing special ATASCII graphics characters now show them as they appear on the monitor screen. A customized typesetting font was designed for us to reproduce special characters accurately and unambiguously (see Fig. 1).

We now prepare our listings on diskette, and transmit them to the typesetter via the phone lines. Equipment used in this operation include an ATARI 800 computer with 48K RAM, a PERCOM Disk Drive, the ATARI 850 Interface Module, and the Hayes Smartmodem 1200. Datasoft's Tele-Talk terminal program for the ATARI performs admirably as our communication software.

The process begins at the ANTIC office with a program which has been accepted for publication. Usually we've received a version of the program on disk, or converted it from cassette. A few codes are added to the beginning and end of the program to identify it to the computer at the typesetter's end. The program is then LISTed to disk, so it will be represented as a string of ATASCII symbols.

Once the program has been prepared, it is ready to be transmitted. One of the Smartmodem's advantages is that it can dial a phone number and automatically establish a link with the receiving computer. Once contact has been made, we simply transfer the program from disk to the ATARI, and subsequently from the ATARI to the computer on the other end of the link.

The first step is accomplished with a few keystrokes, as Tele-Talk is menu-driven. To transmit text files, Tele-Talk has a special spooling feature. Normally, this option is used for storing received (downloaded) data to a disk file, so at this point a prompt for a disk filename appears (i.e. "D1:"). To send the text to the other computer, it must be spooled through the RS-232 interface. Therefore, simply use the screen editor to change "D1:" to "R1:" and press RETURN. The text will be transmitted, though not displayed on the screen.

The typesetter's computer receives a stream of numbers from 0 to 255, each of which represents an ATASCII character. Most of these characters (i.e. letters, numbers, and punctuation) fulfill a direct correspondence with the ASCII character set, and therefore don't need translation by the typesetter. That is, the typesetter knows which characters are represented by the corresponding decimal value for the standard ASCII character set and doesn't need any special instructions to set those characters.

However, ATARI BASIC contains many special characters which have no representation in the normal ASCII character set. These include graphics characters (obtained by pressing CONTROL and certain keys in combination), control characters (cursor movement symbols and the clear screen symbol), and inverse video characters, all of which are used frequently in ATARI BASIC programs. Each of these is represented by a specific decimal value from 0 to 255. Therefore, the typesetter needs merely to know the list of special characters and their corresponding decimal value, and he can substitute accordingly.

Of course, the set of special characters must be defined by the typesetter so that his machine will know what to print when it encounters certain decimal codes during the translation process. He does this by combining rules (short thin lines) to form the character within the character space. Once it has been defined, the special character can be reused indefinitely, just like any other character used in typesetting.

The upshot of all this is that most program listings published in ANTIC from now on will be easier to read and to type in than any listings from any source you've previously encountered. When a programmer uses a special character, it will appear in the printed listing exactly as it does on the monitor screen.

One drawback of the typesetting system we are using is that spaces cannot be represented as characters of fixed length. So, program lines will not have the same length relationships in a published listing as they do on the screen. We considered using monospacing and a 40-column format, but decided that the legibility of our system is preferable. Therefore, if there is any doubt concerning the number of spaces to type in a given program line, we will insert a REM (remark) statement immediately before the line to indicate how many spaces are present in the dubious area.

continued on page 46



DISKEY

by Sparky Starks

Potential into practical reality. This is the core of DISKEY — a remarkable utility program that gives ATARI disk drive owners the flexibility to accomplish tasks that other utilities either ignored or only hinted at. With DISKEY, the user will be able to actually examine a disk and its directory, and repair some files that might otherwise have been lost. DISKEY also performs a multitude of other practical functions, including the following:

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- ★ Sends contents of disk to printer selectively
- ★ Up to four separate drives may be addressed
- ★ Can be used to backup some of those "unbackupable" disks
- ★ Allows direct examination of any file
- ★ Over 50 separate key functions available

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ATARI 400/800 32K DISK
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(Note: Some features will require 40K)

SOME OF DISKEY KEY FUNCTIONS

A	Clear screen and filename
B	Byte compare, D1 to D2, OS to DS
C	Copy sectors, OD to DD, OS to DS
D	Toggle destination drive
E	Erase disk (format)
F	Select file sub-menu
L	Set automatic function lower limit (OS)
M	Modify Sector Map
N	New destination sector
O	Toggle originate drive
P	Print screen to printer
Q	Query (search for hex key, drive OD, sector OS to DS)
R	Read new OS, set DS to match
S	Search for ASCII key, drive OD, sector OS to DS
T	Tape to disk
U	Upper case conversion of printer lower case
V	Toggle write verify
W	Write memory buffer to sector DS, drive DD
X	Select EOR Sector Map screen print mask
Z	Zero memory buffer
+	Read upward, next sector on disk
–	Read downward
?	Directory information
!	Select directory sub-menu
cB	Byte compare, D1 to D2, whole disk
cC	Copy D1 to D2, whole disk
cD	Decimal to hex, ASCII conversion
cE	Erase disk (without new format)
cF	Modify sector forward sector chain reference
cH	Hex to decimal, ASCII conversion
cL	Locate bad sector on drive OD
cN	Modify sector file number reference
cO	Select one-drive functions sub-program
cP	Print current Disk Map
cR	RPM test drive OD
cS	Special file copy, no directory reference from source
cV	VTOC update and repair, drive OD
cY	Toggle Sure Response prompt enable
FA	File binary load address headers to printer
FD	Delete file
FF	Select filename for all file functions
FL	Lock file
FM	Show memory address load position in file
FQ	Relative Query
FR	Rename file
FS	Relative Search

BASIC ROUTINES FOR THE ATARI

by Jerry White

Finally, a self-help system that cuts through the stuffy technical jargon and allows the user to learn effective programming techniques fast! BASIC ROUTINES FOR THE ATARI has been written especially for ATARI 400 or 800 users who wish to write programs in BASIC. This package comes complete with an extensive manual and your choice of a tape or disk which contains all of the routines from the manual — which means you'll be able to actually see each of them in action on your ATARI. Some of the BASIC routines include joystick, sound, player missile strings and much more — and presented in a way that you'll quickly be able to learn and apply to your own programs.

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continued from page 44

Table Information

Our custom font listings represent each ATASCII character as it appears on the video screen. You generate some characters by a single keystroke, for example, the regular alphabet. Others require a combination or sequence of keystrokes. In this table, ESC means *press and release* the escape key before pressing another key. CTRL or SHIFT means *press and hold* the control or shift key while simultaneously pressing the following key.

The Atari logo key (⅄) "toggles" inverse video for all alphanumeric and punctuation characters. Press the logo key once to turn it on; press again to turn it off. On the 1200XL there is no logo key; inverse video is controlled by a key on the function row. Decimal values are given as reference, and correspond to the CHR$ values often used in BASIC listings.

NORMAL VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	CTRL ,	0
	CTRL A	1
	CTRL B	2
	CTRL C	3
	CTRL D	4
	CTRL E	5
	CTRL F	6
	CTRL G	7
	CTRL H	8
	CTRL I	9
	CTRL J	10
	CTRL K	11
	CTRL L	12
	CTRL M	13
	CTRL N	14
	CTRL O	15
	CTRL P	16
	CTRL Q	17
	CTRL R	18
	CTRL S	19
	CTRL T	20
	CTRL U	21
	CTRL V	22
	CTRL W	23
	CTRL X	24
	CTRL Y	25
	CTRL Z	26
	ESC ESC	27
	ESC CTRL −	28
	ESC CTRL =	29
	ESC CTRL +	30
	ESC CTRL *	31
	CTRL .	96
	CTRL ;	123
|	CTRL =	124
	ESC SHIFT CLEAR	125
	ESC DELETE	126
	ESC TAB	127

INVERSE VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	⅄CTRL ,	128
	⅄CTRL A	129
	⅄CTRL B	130
	⅄CTRL C	131
	⅄CTRL D	132
	⅄CTRL E	133
	⅄CTRL F	134
	⅄CTRL G	135
	⅄CTRL H	136
	⅄CTRL I	137
	⅄CTRL J	138
	⅄CTRL K	139
	⅄CTRL L	140
	⅄CTRL M	141
	⅄CTRL N	142
	⅄CTRL O	143
	⅄CTRL P	144
	⅄CTRL Q	145
	⅄CTRL R	146
	⅄CTRL S	147
	⅄CTRL T	148
	⅄CTRL U	149
	⅄CTRL V	150
	⅄CTRL W	151
	⅄CTRL X	152
	⅄CTRL Y	153
	⅄CTRL Z	154
	ESC SHIFT DELETE	156
	ESC SHIFT INSERT	157
	ESC CTRL TAB	158
	ESC SHIFT TAB	159
	⅄CTRL .	224
	⅄CTRL ;	251
	⅄SHIFT =	252
	ESC CTRL 2	253
	ESC CTRL DELETE	254
	ESC CTRL INSERT	255

Slaying Monsters Is No Game

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ANTIC PIX TEN AGAIN

by DAVID DUBERMAN

■ FROGGER ■

Sierra On-Line

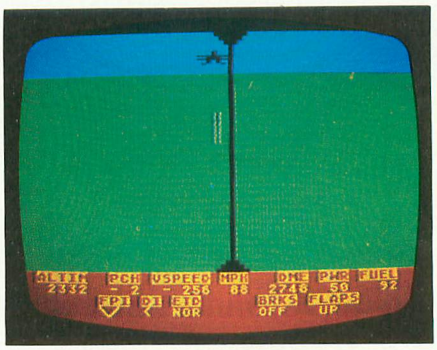
When in the course of amphibian events it becomes necessary to cross human paths, the going can be extremely harrowing. In Frogger you direct a small, defenseless frog across a busy highway and a canal jammed with logs and turtles. You've got to dodge the speeding motorists, hop across turtle backs and drifting logs, and finally leap to a safe alcove on the far side of the stream. Do this five times, and you start all over again — with faster cars and trickier turtles.



■ FINAL FLIGHT ■

MMG Software

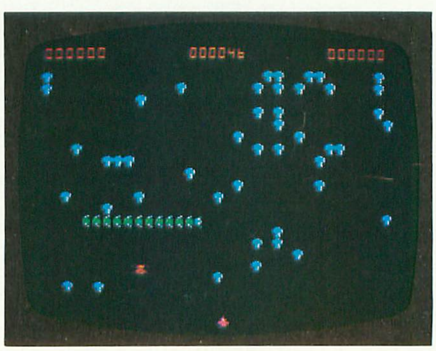
This is a real-time flight and landing simulator for a small plane similar to a Cessna. You're approaching the air strip, and must use your instruments and the view from your cockpit to land safely. You control pitch (angle with the ground), yaw (angle about the plane's vertical axis), and power with your joystick. You may choose flying conditions and decide whether or not to use your instruments. Overall, this is an excellent and convincing simulation.

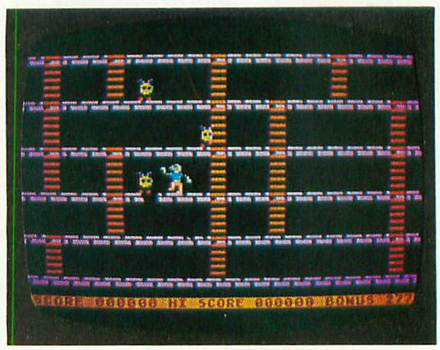


■ CENTIPEDE ■

Atari, Inc.

The beautiful garden you have tended so well is about to be invaded by all sorts of crawling, creeping nasties. First, the centipede starts snaking its way towards you from the top of the garden. You can disintegrate it one segment at a time by shooting from your position near the bottom, but there are lots of mushrooms blocking your aim. Next, the evil spider leaps at you from the side. Meanwhile, a tribe of mischievous fleas drops down from above, leaving forests of annoying mushrooms in its wake. A scorpion floats across the screen. poisoning any mushroom in its path. The action is nonstop and exhilirating, and you're guaranteed to come back for more.

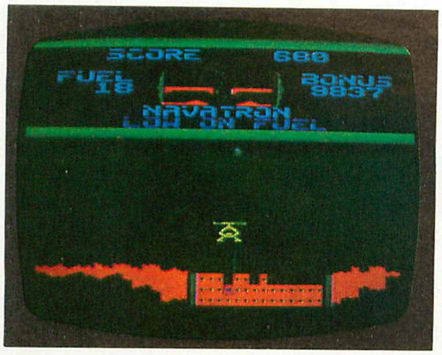




■ APPLE PANIC ■

Broderbund Software

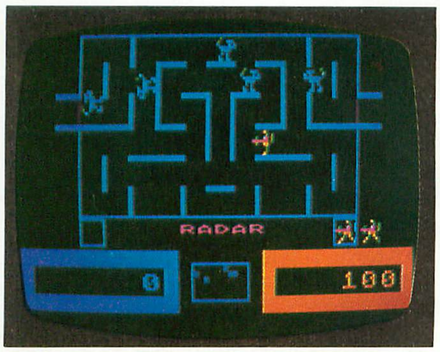
First of the "ladder"-type games for the ATARI, Apple Panic has established a foothold as a perennial favorite. The object is simply to get rid of the several apples pursuing you about the multi-level playing field. To do this, you dig holes in the different levels with your pickaxe (press the joystick fire button), and when one of the apples gets stuck in a hole, you scurry back and bash it with your pickaxe. When you've eliminated all the apples, faster ones appear to plague you some more.



■ FORT ■ ■ APOCALYPSE ■

Synapse Software

As an assault pilot for the Sky Dwellers, your mission is to invade Fort Apocalypse, free the enslaved masses from the dreaded Kralthans, and destroy the fortress. Flying your Rocket Copter, you must dodge or shoot down Self-Propelled Mines, Robotchoppers, and Servo-Tank Interceptors, while rescuing hostages and avoiding the walls and impact shields. To complete the game, you must thoroughly cover the eight vertically and horizontally scrolling levels.



■ WIZARD OF WOR ■

Roklan Software

The Wizard of Wor and his worlings pose a formidable challenge to players trapped in this maze world. Two players can cooperate or compete for points, or a player can take on the task single-handedly. You move your worrior with a joystick, pressing the fire button to shoot at worlings you encounter. Worlings sometimes become invisible, and move much faster when they change color. The radar scanner below the maze tracks the beasts when they're invisible. The many tight turns in the mazes don't allow for maneuvering, so you need extremely quick reflexes to master this game.

■ SANDS OF EGYPT ■

Datasoft Inc.

Lord Charles Buckingham, highly cultured explorer, is stranded in the Egyptian desert with naught but a compass. In this animated graphics adventure, you guide Lord Charles about the desert, seeking the lost pyramid wherein lies the secret treasure. Your ultimate goal is to bring this invaluable prize back to civilization, so mapping is a must. The animation takes the form of a shifting landscape when you move, and floating clouds in the sky. Sands of Egypt is a difficult but enjoyable adventure.

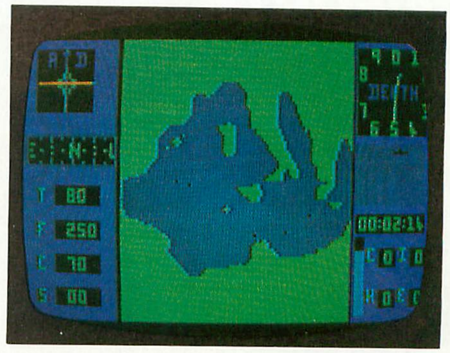


■ CASTLE ■ ■ WOLFENSTEIN ■

Muse Software

This popular Apple game has recently been converted for the ATARI, and the result is exciting action-adventure. You are a prisoner of the Nazis. Armed with a pistol entrusted to you by a dying cellmate, you must find the Nazi war plans and escape the castle alive. In your escape, you'll move through dozens of rooms on different levels, encounter guards and SS stormtroopers, and find numerous chests. Only one of the chests contains war plans, but the rest hold extra bullets or grenades you can use to fight the Nazis. Many traps and pitfalls hinder your mission, but what fun would it be without that?

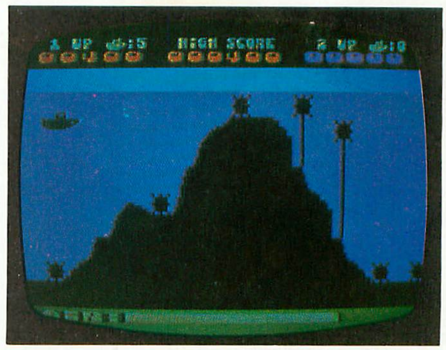




■ SUBMARINE ■ ■ COMMANDER ■

Thorn E.M.I.

This is a combination simulation and war game. Your mission is to destroy all enemy merchant shipping in the Mediterranean Sea. The sub is equipped with a map, sonar, periscope, and torpedos. You have a full instrument panel to help you evade the enemy's shells and depth charges, and to attack him undetected. Controls are: Surface, Dive, Rudder, and Neutralize Buoyancy. Submarine Commander is an extremely sophisticated simulation with the added fun of gaming excitement.



■ SEA DRAGON ■

Adventure International

Your mission in Sea Dragon is to guide your submarine through mine fields and underground caverns, seeking the Master Mine whose destruction will wipe out the enemy and ensure victory for your side. On your way, you must avoid hundreds of mines, depth charges, laser bases, and supershooters planted throughout the playfield. Meanwhile, it's extremely important to monitor your air supply and rise to the surface when air is low. The journey covers 30 screens horizontally, and is divided into six distinct zones of increasing difficulty. If you're hit, you return to the beginning of the current zone.

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By David Feitelberg from Acorn

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From Synapse

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Positive, Negative or Zero

by BOB ALBRECHT and
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An easy problem. All we want is a program that asks for a number, then tells you something about the number.

- If you enter a positive number, the computer tells you: YOUR NUMBER IS POSITIVE
- If you enter a negative number, the computer tells you: YOUR NUMBER IS NEGATIVE
- If you enter the number zero (0), the computer tells you: YOUR NUMBER IS ZERO

A RUN might go like this:

```
ENTER A NUMBER AND I'LL TELL
YOU WHETHER YOUR NUMBER IS
POSITIVE, NEGATIVE OR ZERO

YOUR NUMBER? 2
YOUR NUMBER IS POSITIVE

YOUR NUMBER? -7
YOUR NUMBER IS NEGATIVE

YOUR NUMBER? 0
YOUR NUMBER IS ZERO

YOUR NUMBER ? and so on
```

We know at least seven ways to write this program. Here is an obvious way.

```
100 REM ** POSITIVE, NEGATIVE, OR ZERO
110 DIM YN$(15), N$(8), Z$(4), P$(8)
120 YN$ = "YOUR NUMBER IS "
130 N$ = "NEGATIVE"
140 Z$ = "ZERO"
150 P$ = "POSITIVE"

200 REM ** TELL WHAT TO DO
210 PRINT CHR$(125)
220 PRINT "ENTER A NUMBER AND I'LL TELL"
230 PRINT "YOU WHETHER YOUR NUMBER IS"
240 PRINT "POSITIVE, NEGATIVE, OR ZERO."

300 REM ** ASK FOR A NUMBER
310 PRINT
320 PRINT "YOUR NUMBER";: INPUT X
400 REM ** TELL ABOUT NUMBER
410 IF X<0 THEN PRINT YN$; N$
420 IF X=0 THEN PRINT YN$; Z$
430 IF X>0 THEN PRINT YN$; P$

500 REM ** GO FOR ANOTHER NUMBER
510 GOTO 310
```

Well, that's one way. We challenge you to write the program without using IF statements. Then write the program in yet another way, and another, and so on. How many *different* ways can you invent?

String Squeezer

Do this one. You will find it useful in future problems. We want a subroutine to squeeze the blanks (spaces) out of a string.

BEFORE SQUEEZING	AFTER SQUEEZING
THE FORCE IS WITH YOU	THEFORCEISWITHYOU
3 D 6	3D6
NEVER ODD OR EVEN	NEVERODDOREVEN
SOUTH DAKOTA	SOUTHDAKOTA

Think of your subroutine as a "black box" which accepts a string ZZ$, squeezes out the spaces, and returns the squeezed string ZZ$.

ZZ$ = "A B C"   STRING SQUEEZER SUBROUTINE   ZZ$ = "ABC"

Complete the following program by writing the STRING SQUEEZER SUBROUTINE.

If you use other string variables, add them to DIM

```
100 REM ** STRING SQUEEZER
110 DIM A$(50), ZZ$(50)
120 PRINT CHR$(125)

200 REM ** GET STRING & SQUEEZE
210 PRINT
220 PRINT "YOUR STRING";: INPUT A$
230 ZZ$ = A$: GOSUB 910
240 PRINT ZZ$
250 GOTO 210

900 REM ** STRING SQUEEZER SUBROUTINE
```

You do this.

Here is a sample RUN of our program.

```
YOUR STRING? THE FORCE IS WITH YOU
THEFORCEISWITHYOU

YOUR STRING? 3 D 6
3D6

YOUR STRING? and so on.
```

Two-Digit Number Splitter

A two-digit number is a whole number in the range 10 to 99, inclusive. A two-digit number has a *tens digit* and a *ones digit*.

TWO-DIGIT NUMBER	TENS DIGIT	ONES DIGIT
10	1	0
23	2	3
32	3	2
99	9	9

Write a program to "split" a two-digit number and print the digits separately, line this:

```
TWO-DIGIT NUMBER, PLEASE? 10
TENS DIGIT = 1
ONES DIGIT = 0

TWO-DIGIT NUMBER, PLEASE? 23
TENS DIGIT = 2
ONES DIGIT = 3

TWO-DIGIT NUMBER, PLEASE? 07
MUST BE A WHOLE NUMBER, 10 TO 99

TWO-DIGIT NUMBER, PLEASE? 123
MUST BE A WHOLE NUMBER, 10 TO 99

TWO-DIGIT NUMBER, PLEASE? 1.2
MUST BE A WHOLE NUMBER, 10 TO 99

TWO-DIGIT NUMBER, PLEASE?
```

And so on. Accept only whole numbers, 10 to 99.

The Digit Factory

In the Digit Factory, the raw materials are the numbers 1, 2, 3, 4, and 5; the BASIC operations +, –, *, and /; and parentheses ().

The finished products are the decimal digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

You are the digit maker. For each decimal digit, 0 through 9, write a BASIC expression whose value is equal to the digit. In any such expression:

- Use each number (1,2,3,4,5) once and only once.
- Use each BASIC operation (+,–,*./) once and only once. No other BASIC operations may be used.
- Use as many parentheses as you wish.

For example, here are three BASIC expressions for the digit 5.

- 2*3/1 + 4 – 5
- (3+2–1)*5/4
- (3+2)/(1*5–4)

Write BASIC expressions for each digit, 0 through 9. Try to write expressions for which one or more of the following is true.

- The numbers 1, 2, 3, 4, and 5 appear in increasing order from left to right.
- The numbers are in decreasing order (5, 4, 3, 2, 1).
- The operations appear in the order +, –, *, / from left to right.
- The operations appear in the order /, *, –, + from left to right.

May your factory prosper. Send us some interesting solutions.

continued on next page

Game Master's Apprentice

Last time, we encouraged you to write a program to roll and display the seven basic characteristics for a character in a fantasy role playing game. Here is our program.

```
100 REM ** ROLL A CHARACTER
110 PRINT CHR$(125)

300 REM ** ROLL & DISPLAY CHARACTERISTICS
310 GOSUB 910: PRINT "STR", DICE
320 GOSUB 910: PRINT "CON", DICE
330 GOSUB 910: PRINT "SIZ", DICE
340 GOSUB 910: PRINT "INT", DICE
350 GOSUB 910: PRINT "POW", DICE
360 GOSUB 910: PRINT "DEX", DICE
370 GOSUB 910: PRINT "CHA", DICE

500 REM ** TELL HOW TO DO AGAIN
510 PRINT
520 PRINT "TO DO AGAIN, PRESS SPACE BAR"
530 OPEN #1, 4, 0, "K:"
540 GET #1, KEY
550 IF KEY <> ASC(" ") THEN 540
560 CLOSE #1
570 GOTO 110

900 REM ** DICE SUBROUTINE
910 D1 = INT(6*RND(0))
920 D2 = INT(6*RND(0))
930 D3 = INT(6*RND(0))
940 DICE = D1 + D2 + D3
950 RETURN
```

We entered the program and typed RUN. Here is our first character.

```
STR  11  This is Bridla. Here name is
CON  12  Gaelic and means "strong friend."
SIZ  10  She is very intelligent (INT 15)
INT  15  and persuasive (CHA 16).
POW  6
DEX  11
CHA  16

TO DO AGAIN, PRESS SPACE BAR
```

After recording the above information, we pressed the space bar. The computer immediately rolled another character.

```
STR  10
CON  11  Meet Aloysious Anonymous,
SIZ  10  who is average or near
```

INT 12 average in every characteristic.
POW 10
DEX 12
CHA 9

TO DO AGAIN, PRESS SPACE BAR

Aloysious, Bridla, Barostan and Joleen (whom you met last time) are all 16 years old and live in villages near them called Triford in Wundervale. They are characters in a book-in-progress called *Adventurer's Handbook: A Beginner's Guide to Role Playing Games*.

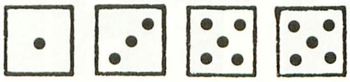
Our program rolls a number from 3 to 18 for each characteristic. Alas, a character with STR 4, SIZ 13, and DEX 5 will never make it in the GAME MASTER's world.

So, your turn. Replace the DICE SUBROUTINE with any of the following, allowed by a compassionate GM (GAME MASTER). Each of these is a *simulation* (imitation) of what might happen in an actual game.

Roll 3D6. If DICE is less than 6, assign 6 as the value. The value of DICE will be a number from 6 to 18.

This GM is even more generous. If DICE is less than 6, add 3.

Some GMs allow plays to roll 4D6 and take the best 3D6. That is, if you roll



, you can discard



and take the other three for a total of 13.

A Book We Wish We Had Written

As perennial beginners, we find the *Atari 400/800 BASIC Reference Manual* virtually incomprehensible. Fortunately, however, we found a book that, so far, has told us everything we want to know. Here it is:

Your Atari Computer by Lon Poole with Martin McNiff & Steven Cook. Published by Osborne/Mc-Graw-Hill, 630 Bancroft Way, Berkeley, CA 94710.

Thanks, Lon, Martin, and Steve!

Your Turn

What would *you* like to see in DragonSmoke? Would you like to see solutions in both Atari BASIC and Atari Microsoft BASIC? Send requests to George & Bob, P.O. Box 310, Menlo Park, CA 94025.

If you want a reply, enclosed a Self-Addressed, Stamped Envelope.

MICROIDS

by STEPHEN GROLL

It is the year 1993. Scientists have developed a new type of germ warfare called Microids. This deadly combination of genetic engineering and submicroscopic electronics has produced an almost indestructible man-made microbe. The advantage of these microbes is that their behavior and movement can be controlled by humans.

The first series of Microids was only partially successful. They were deadly and able to reproduce themselves, but they remain totally uncontrollable and thus very dangerous.

The only hope of ridding mankind of this cursed infection was to develop an advanced Microid which could be controlled and used as an *anti*microbiotic. One such Microid has been developed, the Series Two Microid.

The first version of the game is called *Multiplying Microids* and is described below.

You view the Microids under a powerful, electronic microscope. Note that the stationary, yellow, star-shaped objects are the terrible Series One Microids. The blue, moving Microid is the new, semi-controllable Series Two Microid.

The Series Two has a will of its own, but it can be controlled to some extent using the microid repellers. The light-green, pointed probes at the top, bottom, and sides of the screen will flash red when the joystick is moved in their directions. When any of these probes are activated the Series Two will move in a general direction *away* from the side of the screen with the flashing probe.

Your task is to maneuver the Series Two to touch the top or the bottom edge of the yellow Microids so that it will consume them. Do not let it touch the left side or the right side or it will mate with the Series One and another yellow Microid will appear on the screen.

There is one other important means of control. If you press the joystick button, the blue moving Microid will turn green. When the Series Two is green it will eat the yellow Microids from either side and it will mate at the tops and bottoms.

Once all the yellow Microids are cleared off the screen, maneuver the Series Two back into the Microid cage (the box in the center of the screen). This must be done before your points, displayed upper left-hand corner, reach zero. Whatever points are left at the end of a round will be added to your score, which is displayed in the upper right-hand corner.

Each new round begins with one more yellow Microid. The game will end if the points reach zero before you clear the screen and get the Series Two back in the cage.

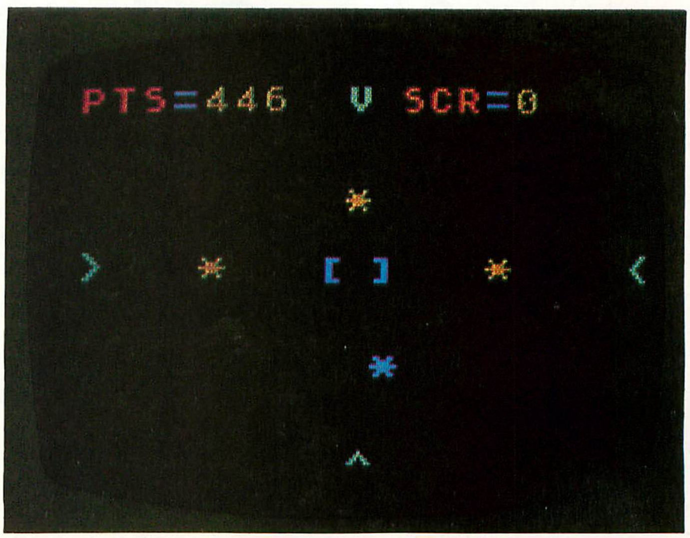
The second version of the game is called Flip Flop Microids. In this version the moving Microid will eat the yellow Microids as it passes over them from any of the four sides, leaving behind a red marker. If the moving Microid passes over the red marker, the yellow Microid will reappear.

The object again is to clear all the yellow Microids off the screen and maneuver the moving Microid into the cage before the points reach zero. Each round adds another yellow Microid to the challenge.

In this version pressing and holding the joystick button will slow the fast-moving Microid down making it easier to maneuver. But use this option sparingly as it will use up your points much faster.

To select the version you want to play, type RUN, then press the joystick button when the desired version appears on the screen. When the game ends, press the joystick button and game-version display will reappear.

continued on page 59



Stephen Groll, a parent and Baptist clergyman, is a self-taught programmer on the ATARI 400. Microids is his first graphics game.



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MEMORY REQUIREMENTS 8K

```
100 GOTO 5000
400 RD=0:ADMIC=0:SCR=0:GPTS=501:
    IF GAM=1 THEN GPTS=1001
500 GRAPHICS 18:A=10:B=5:MIC=4:
    CH=3:POSITION O,O:? #6;
    "pts =":POSITION 11,0:? #6;
    "scr =":PTS=GPTS
501 POSITION 4,5:? #6;
    "*":POSITION 14,5:? #6;"*":
    POSITION 9,3:? #6;
    "*":POSITION 9,7:? #6;
    "*":POKE 77,0
502 POSITION 15,0:? #6;
    SCR:IF ADMIC=1 AND RD>0
    THEN FOR L=1 TO RD:
    GOSUB 780:NEXT L:ADMIC=0
504 PTS=PTS-1:POSITION 9,0:
    ? #6;"v":IF PTS<0 THEN 7000
506 POSITION 8,5:? #6;"[  ]"
510 POSITION 0,5:? #6;CHR$(30):
    POSITION 19,5:? #6;
    CHR$(28):POSITION 9,
    11:? #6;CHR$(126)
515 IF STRIG(0)=0 THEN GOSUB 6700
516 IF STRIG(0)=1 AND CH=2 THEN CH=1
518 IF STRIG(0)=1 AND CH=3 THEN CH=0
519 POSITION A,B:? #6;" "
520 Z=INT(4*RND(1))+1
530 IF Z=1 THEN A=A-1
540 IF Z=2 THEN B=B+1
550 IF Z=4 THEN B=B-1
560 IF Z=3 THEN A=A+1
562 IF STICK(0)=7 OR STICK(0)=11
    THEN 5500
563 IF STICK(0)=14 OR STICK(0)=13
    THEN 5520
567 IF STICK(0)=15 OR STICK(0)
    =5 OR STICK(0)=6 OR STICK(0)
    =10 OR STICK(0)=9
    THEN SOUND 2,0,0,0
570 IF A=0 THEN A=1
580 IF B=0 THEN B=1
590 IF B>10 THEN B=10
600 IF A>18 THEN A=18
605 LOCATE A,B,X
607 IF X=42 THEN MIC=MIC-1
610 SOUND 1,A+B+10,10,8
620 POSITION A,B:? #6;"*":
    IF GAM=1 THEN 8000
635 LOCATE A-1,B,X
640 IF X=42 THEN GOTO 6000
650 LOCATE A+1,B,X
652 IF X=42 THEN GOTO 6030
660 LOCATE A,B+1,X
670 IF X=42 THEN GOTO 6500
680 LOCATE A,B-1,X
690 IF X=42 THEN GOTO 6600
765 LOCATE A-1,B,X
767 POSITION 5,0:? #6;"      ":
    POSITION 4,0:? #6;PTS:
    IF MIC=0 AND A=9 AND B=5
    THEN POSITION 8,5:
    ? #6;"[*]":GOTO 1000
769 GOTO 504
770 SOUND 1,0,0,0:FOR T=1 TO 100:NEXT T
780 S=INT(18*RND(1))+1:
    D=INT(10*RND(1))+1
790 LOCATE S,D,X
800 IF X<>32 THEN 780
805 IF (S=8 OR S=9 OR S=10) AND D=5
    THEN 780
810 POSITION S,D:? #6;"*":
    MIC=MIC+1:IF ADMIC=1 THEN RETURN
820 GOTO 504
1000 FOR L=1 TO 150:SHD=INT(15*RND(1))
1010 C=INT(5*RND(1)):HUE=INT(16*RND(1)):
     SETCOLOR C,HUE,SHD:SOUND 2,
     (C+HUE)*10,12,8:
     SOUND 1,(C+HUE)*3,0,8:NEXT L
1020 SOUND 0,0,0,0:SOUND 1,0,0,0:
     SOUND 2,0,0,0:RD=RD+1:ADMIC=1
1030 SCR=SCR+PTS:GOTO 500
5000 GRAPHICS 18:SETCOLOR 0,0,0:
     POSITION 6,2:? #6;"MICROIDS":
     POSITION 9,5:? #6;"BY"
5010 POSITION 4,8:? #6;"STEVE  GROLL"
5020 FOR L=1 TO 70:POKE 712,INT(16*RND(0))
     *16+INT(16*RND(0)):
     SOUND 0,PEEK(53770),12,8:
     NEXT L:SOUND 0,0,0,0
5030 GRAPHICS 18:IF STRIG(0)=0 THEN 5030
5040 SETCOLOR 4,7,2:POSITION 0,2:
     ? #6;"fire joystick button":POSITION 1,4:
     ? #6;" when game appears"
5050 FOR L=1 TO 50:POSITION 0,7:
     ? #6;"MULTIPLYING MICROIDS":
     GAM=0:IF STRIG
     (0)=0 THEN 400
5055 NEXT L
5060 FOR L=1 TO 50:POSITION 0,7:? #6;
     " flip flop microids  ":
     GAM=1:IF STRIG(0)=0 THEN 400
5065 NEXT L:GOTO 5050
5500 IF STICK(0)=7 THEN POSITION 19,5:
     ? #6;CHR$(156):      SOUND 2,85,12,8:
     IF Z=3 THEN A=A-2
5510 IF STICK(0)=11 THEN POSITION 0,5:
     ? #6;CHR$(158):      SOUND 2,85,12,8:
     IF Z=1 THEN A=A+2
5515 GOTO 570
5520 IF STICK(0)=14 THEN POSITION 9,0:
     ? #6;CHR$(246):      SOUND 2,85,12,8:
     IF Z=4 THEN B=B+2
5530 IF STICK(0)=13 THEN POSITION 9,11:
     ? #6;CHR$(254):      SOUND 2,85,12,8:
     IF Z=2 THEN B=B-2
5535 GOTO 570
6000 IF CH=0 OR CH=3 THEN 770
6020 IF CH=1 OR CH=2 THEN MIC=MIC-1:
```

continued on next page

```
     POSITION A,B:? #6;" ":
     A=A-1:GOTO 620
6030 IF CH=0 OR CH=3 THEN 770
6040 IF CH=1 OR CH=2 THEN MIC=MIC-1:
     POSITION A,B:? #6;" ":
     A=A+1:GOTO 620
6500 IF CH=1 OR CH=2 THEN 770
6520 IF CH=0 OR CH=3 THEN MIC=MIC-1:
     POSITION A,B:? #6;" ":
     B=B+1:GOTO 620
6600 IF CH=1 OR CH=2 THEN 770
6620 IF CH=0 OR CH=3 THEN MIC=MIC-1:
     POSITION A,B:? #6;" ":
     B=B-1:GOTO 620
6700 IF CH=0 THEN SETCOLOR 2,11,2:CH=2
6710 IF CH=1 THEN SETCOLOR 2,9,4:CH=3
6720 RETURN
7000     SOUND 1,0,0,0:     SOUND 2,0,0,0:
     POSITION 5,5:? #6;
     "game over":IF STRIG(0)
     =0 THEN 7000
7010 IF STRIG(0)=1 THEN 7010
7020 GOTO 5030
8000 IF X=42 THEN POSITION A,B:? #6;
     CHR$(142):GOTO 520
8010 IF X=142 THEN POSITION A,B:? #6;"*":
     MIC=MIC+1:GOTO 520
8015 IF STRIG(0)=0 THEN PTS=PTS-2:
     FOR T=1 TO 10:NEXT T:IF PTS<1
     THEN PTS=0
8020 GOTO 767
```

TYPO TABLE

Variable checksum = 313533

Line num range		Code	Length
100 –	504	QR	534
506 –	562	SP	515
563 –	640	CY	462
650 –	790	JI	453
800 –	5000	UC	605
5010 –	5055	VR	503
5060 –	5520	MX	519
5530 –	6600	DH	521
6620 –	8015	YO	581
8020 –	8020	NY	13

ATARI VCS

by DAN GUTMAN

It used to be that computer owners could dismiss the Atari 2600 VCS (Video Computer System) as a mere plaything that temporarily infatuated millions of Americans. Video game systems were just toys compared to the more powerful and versatile "real" computers.

But now, the four best-selling video game systems (Atari VCS, Atari 5200, ColecoVision and Intellivision II) all have plug-in expansion modules to add a keyboard and more memory to the basic game system. Just as personal computers began playing games a few years ago, this year the game systems have become computers. No longer are there video game systems *and* computers. The differences have diminished to the point that they are now one product.

Because of this, the Atari Video game systems will receive coverage in these pages. And what could be better to start with than one that's in ten million homes, the Atari VCS?

A LITTLE HISTORY

Credit for the VCS usually goes to Nolan Bushnell, who started Atari with $500 and gave us *Pong* in 1972. Actually, it was principally invented by Atari's Steven T. Mayer, who had also helped design the ATARI 400 and 800 computers. The VCS came out in 1977, but didn't catch on for quite a while. It wasn't until Bushnell left Atari in January of 1979 that *Space Invaders* arrived and the VCS took off. Now, despite the fact that Intellivision, ColecoVision and the Atari 5200 easily outstrip it in computing power, more than half of the video game systems in American homes are the Atari VCS. Originally sold for $180, it was last sighted at $95 and dropping.

Dan Gutman is Editor-in-Chief of Video Games Player *magazine, and a former editor of* Electronic Fun. *He is also an owner/user of an ATARI 800 computer, and will be contributing regularly to our* Games Department.



LET'S GET PHYSICAL

The VCS is a good-looking little machine made of black and brown simulated-wood plastic. The cartridge slot is right in the middle, flanked by four switches: Power, Game Reset, Game Select and Color / B&W. Game Select is for games like *Space Invaders*, that has 112 different variations. Recently, the Color / B&W switch has been used for other purposes. In Spectravision's *Nexar*, for instance, that switch will freeze the action idefinitely so you can answer the phone (or even go on vacation) and resume the game when you return. In the back of the VCS is a switch that manipulates the difficulty level of the game.

Packed with the VCS are two joysticks, two paddle controllers (for horizontal-movement games like *Breakout*), a TV / game switch box and a *Combat* cartridge.

Inside, the VCS sports a 6507 microprocessor. The 5200 game machine and the 400 / 800 computer carry the 6502, which can address more memory. This affects the number

continued on next page

of independently positioned objects the screen can handle on one line. The VCS allows a programmer to manipulate five independently moving objects while the 6502 grants him eight. However, the VCS has something the computers don't — repeat register. This feature gives a designer the freedom to copy objects on the screen and repeat them without using more memory. In effect, it gives the illusion of a more complex game.

HUNDREDS OF GAMES

At last count, there were over 200 game cartridges for the VCS, triple the number for any other system. With so many VCS's out there, software companies have stuck to designing VCS games instead of switching to flashier games for the ColecoVision, etc. Activision, formed by four ex-Atarians, was the first company other than Atari to manufacture games for the VCS. Soon after, in 1981, other companies joined the fray almost every week — Imagic, Parker Brothers, U.S. Games, Spectravision, Telesys, CBS, Sega, CommaVid, Twentieth Century Fox, Tigervision, Coleco and even arch-rival Mattel.

Atari now has nearly 20 such competitors, which certainly contributed to the Warner Communication "bombshell" that Atari games were not selling as well as previously. But this has been a blessing to the consumer, who has the choice of virtually any game imaginable if he or she owns the VCS.

Originally, the VCS was designed to do two things — play *Pong*-type games and play tank-battle games. In fact, in the beginning nobody at Atari dreamed the 4K program capacity of the machine would ever be fully utilized. But video game designers, in their zest to program more colorful and complex games, have pushed the old warhorse to its limits and beyond. Some of the games approach the quality of computer games that have twice the memory.

First there are the classics — *Space Invaders, Asteroids,* and *Missile Command*. These games brought the middle class into the arcades, and also brought them back home. The Atari VCS versions are not identical to the coin-ops (neither are the 400/800 versions), but they capture the feel and personality of the games. Although *Pac-Man* was a huge disappointment for the millions who ran out to buy it, Atari has consistently provided good games for the VCS. *Defender, Centipede, Berzerk, Ms. Pac-Man, Galaxian* and *Vanguard* are examples. Turkeys included *E.T., Raiders of the Lost Ark*, and most of the sports games. The VCS is great for fast-moving action games, but it takes to sports like an elephant to a birdbath.

Other excellent VCS games are: *Kaboom* and *Pitfall* (Activision), *Demon Attack* (Imagic), *The Empire Strikes Back* (Parker), *Star Gunner* (Telesys), and *Nexar* (Spectravision). Needless to say, there are a good many duds also. VCS games sell for $20 to $30.

Great effort has been taken to squeeze every last ounce of graphic capability from the VCS. Early on, Atari discovered that they could turn 4K games into 8K games by a method called "bank switching." Two 4K chips are packed into the cartridge and they alternately turn on and off, tricking the system into playing an 8K game. Recently, CBS Video Games introduced two games, *Wings* and *Tunnel Runner*, that use a "RAM+PLUS" chip that *triples* the capacity of the VCS. The limits of the cartridge possibly may be extended even further.

ADD-ONS

Not simply content to settle for cartridges, two companies have come out with devices that plug into the VCS and expand its memory even further. The Starpath (Arcadia) Supercharger, designed by Bob Brown, formerly Director of Research at Atari, expands the Random Access Memory of the VCS from 128 bytes to 6,272 bytes. A 50-fold increase in memory gives designers a lot of room to play with, though Starpath has yet to release a monster game.

The Supercharger is the size of two cartridges on top of one another, but it still plugs into the cartridge slot on the VCS. A short cable goes from the Supercharger to any standard cassette recorder. In this way, the Starpath games, which sell for just $15 on tape, get loaded from the tape recorder into the Supercharger. The Supercharger sells for $44.95 (including one game) and Starpath has seven games for it. At this point, no other companies have released games that take advantage of the Supercharger's capability. Amiga will unveil a device similar to the Supercharger in June.

Another improvement in the VCS concerns its controllers, which have a tendency to break after six months of heavy play. No less than 15 companies are selling replacement joysticks and trackballs for every conceivable taste and grip preference. They run from cheap, plastic replacements to huge arcade bat handles for $70 (nearly the price of the VCS). Wico's Three-Way Deluxe Joystick and Suncom's StarFighter are considered the best. Any controller that plugs into the VCS will also plug into the 5200 or the ATARI 400/800/1200.

DEATH OF THE VCS?

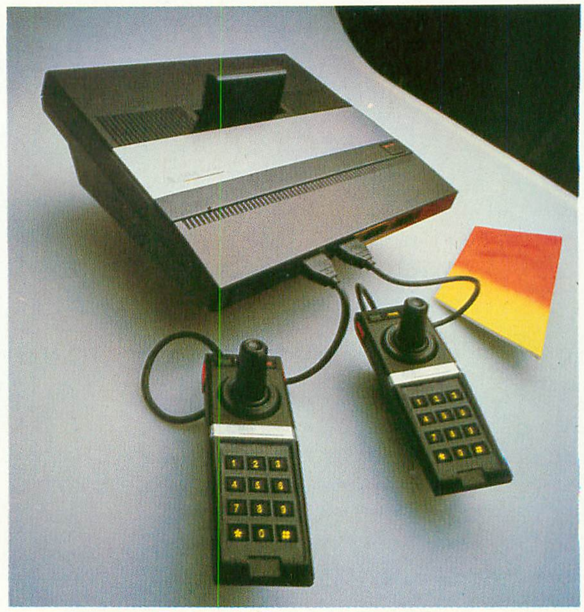
She's a tough old bird. A lot of people like to poke fun at the VCS, saying it's weak and obsolete. But the video-game designers have seen it as opportunity — coming up with ever more powerful chips, improving the joysticks, plugging who-knows-what into it, cramming in some more memory — even using deception to make games *seem* more complicated. Now, with four companies (Atari, Entex, Unitronics and Spectravision) making computer add-ons for it, the rumored death of the VCS has been slightly exaggerated. Unless those ten million VCS owners find a better video game system, with a library as extensive as the Atari 2600 VCS, it may be around in the *year* 2600.



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5200

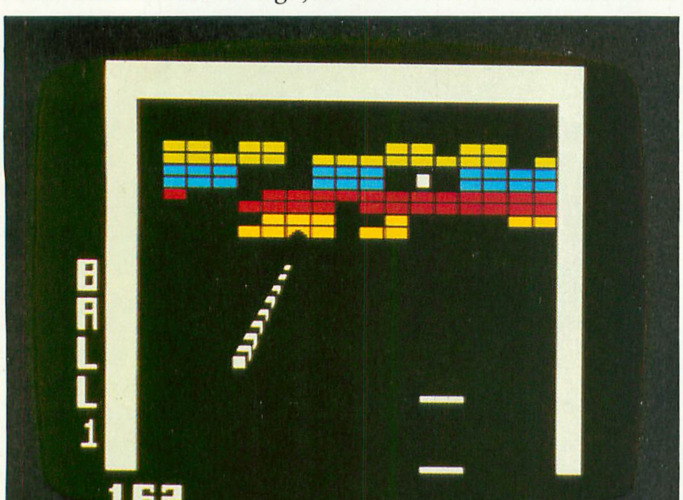
by ROBERT CAPPARELL, M.D.



When my brother asked me to write a short article on the new ATARI 5200, I could hear the cries of nepotism throughout the ANTIC readership. But really folks, I own a 5200, and before that was one of the first to own the original Atari VCS (2600). I don't pretend to be an expert gamesman; in fact, a hot arcade jockey could whip me at most games in a New York minute, but I've played enough to be competitive and know what I like.

Which brings me to the 5200. The console is a work of art, well designed for both play and storage. The controls are easy to grip, with fire buttons on either side (for us southpaws), and while the joystick controller takes a bit of play to get used to, it is a tremendous improvement over the older style. The 12-button keypad allows for a variety of play and hints of great games to come.

START and RESET buttons are conveniently located on the controllers, instead of the console, and the PAUSE button is the greatest innovation since indoor plumbing. The instructions about hookup with your television would make an electrician cringe, but after 15 minutes it all makes sense. Lock in the cartridge, press the ON button, and your TV becomes the closest thing to arcade quality available. Graphics, resolution, game play — it's all here!



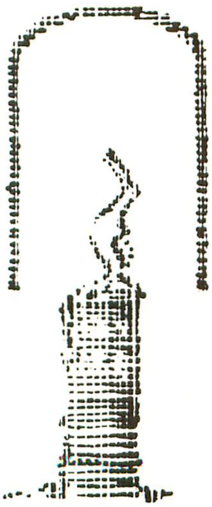
SUPER-BREAKOUT comes with the machine. This paddle-and-ball classic is still enjoyable, even though newer games surpass it by far in graphics and complexity.

The Super Breakout game cartridge comes with the console, which is a bit surprising, in that it does not demonstrate the true capability of the 5200. My first purchase was Star Raiders, and it lived up to its well-deserved reputation among 400-800 owners. In fact, I found that it was easier to navigate my "ship" with the hand-held controller than with the computer console and old joystick. Star Raiders is a must for all 5200 owners tired of one-dimensional frog hopping. The intricacies of the game, including fore and aft viewing, computer assistance, and navigating from one grid to another, may make this a bit too difficult for youngsters less than ten or so, but this is one game that will not gather dust on your shelf.

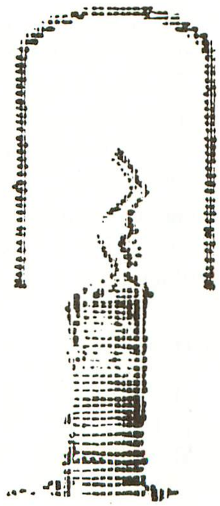
In order to compare arcade quality to ATARI 2600, and 5200 graphics and game play, I next tried Missile Command, one of my favorite "old" games. This is a difficult game on any level, and the 5200 version will be greatly improved with addition of the Track Ball. Even without it, the smooth action of the joystick, improved graphics and resolution, as well as the ability to skip to more difficult levels immediately, make this game a hit with kids of all ages. But watch out! The smart bombs will eventually spell THE END for you. The instruction booklet is extremely helpful, especially the part that states you lose all bonus cities held in reserve after reaching 1,000,000 points.

In summary, if you're into games but can't find the time or the quarters to feed the electronic-arcade appetite, I suggest that you try the next best thing — the ATARI 5200. Hopefully, newer and more innovative cartridges will hit the market soon, to take full advantage of the capabilities built into this system.

Robert Capparell, besides being the publisher's brother, practices medicine in Atlanta, GA. His modesty about gamesmanship is belied by the fact that he was New York State pinball champ while in medical school.



Burning "Candle" at Both Ends



by JACK PERRON and HOWARD CHAN

If you're programming in ATARI BASIC and satisfied with its offerings, this article isn't for you. It's for those who have found ATARI Microsoft BASIC a powerful and versatile programming language. It's also for those who would like to know more about ATARI Microsoft BASIC.

In the December 1982 issue of ANTIC Magazine, there was an interesting ATARI BASIC program called "Candle, Candle, Burning Bright" by Linda M. Schreiber. It dealt with a science experiment which you might recall from school. In the experiment, a burning candle is covered by a jar to show how oxygen keeps a flame lit.

The program offered students hands-on experience with the computer, letting them control the lighting of the candle and the up-and-down movement of the jar. It was an excellent example of the potential for simulations in the science classroom, and illustrated how easily ATARI graphics can be utilized in educational programs.

Yet it also drew our attention to some interesting differences between ATARI BASIC and ATARI Microsoft BASIC. Take for example, the UP$ and DOWN$ variables packed with machine language codes. Rather then placing the code in strings and using the ADDR command to find them in memory, Microsoft has a special command that reserves memory for code that can then be read in as data. But that's not all. There's also the MOVE command to slide Player / Missile graphics around (which means you no longer even need the UP$ and DOWN$ variables).

For those new to the ATARI Home Computer, you may find using ATARI Microsoft BASIC an exciting way to get to know the world's most versatile home computer. You don't have to know much about the computer's operating system, its memory map, or ANTIC, POKEY, and GTIA / CTIA to utilize your ATARI's fascinating graphics, sound, and color capabilities. Microsoft BASIC gives you high-level commands for such needs.

In the listing that follows, we have taken Ms. Schreiber's ATARI BASIC program and converted it to ATARI Microsoft BASIC — burning the candle at the other end, so to speak. In doing so, we have tried to leave the overall program intact. We have replaced only the more complex housekeeping and machine language routines with Microsoft's high-level commands. These commands are for reserving memory, inserting and accessing machine language subroutines, and manipulating Player / Missile graphics.

If you refer to your December 1982 ANTIC (p. 52), you can compare the two programs on a line-by-line basis. In all fairness to ATARI BASIC, you must remember that even though Microsoft offers high-level ease and access in programming, you initially require a higher amount of RAM.

The listing that follows is fully commented. These 11 items below detail some of the major differences:

1. First, all REMARKS are offset by Microsoft's exclamation mark (!). Microsoft also allows the use of the apostrophe (') or REM to offset remarks.

2. LINE #30. Since we will not be using UP$ or DOWN$, we do not need to dimension them. We add the FLAMD array to store the three flame patterns read in LINES #40–43.

3. LINE #80. Here we use the OPTION PLM1 command to reserve memory for Player / Missile graphics. Then VARPTR is used to point to this location and pass that information to PMBASE.

4. In the ATARI BASIC program's LINE #150, provision is made to clear the Player / Missile memory. Microsoft no longer needs this (see LINE #230).

5. LINE #160. PLOT and DRAWTO are replaced by Microsoft's PLOT . . . TO command followed in LINE #170 with FILL . . . TO replacing XIO.

6. LINE #190. Since we now have our flame patterns in an array, we no longer need to use the varying RESTORE to find the data.

continued on next page

The authors both work for the ATARI Home Computer Division. Jack Perron is Educational Software Reviewer for the ATARI Program Exchange and writes a regular column for the ATARI CONNECTION. Howard Chan is Project Manager of both ATARI BASIC and ATARI Microsoft BASIC.

7. LINE #230. We draw the jar with a zero in the first and final bytes, to allow it to clear itself as it moves.

8. LINE #260. Microsoft's RND function uses integer values, picking a random number between 1 and the integer value in the parentheses.

9. LINES #430–440. We replace the USR machine language call with the Microsoft command MOVE.

10. LINE #530. The selective reading of flame data is replaced by the FLAMD array.

11. LINES #560–590. The INT routine is no longer needed.

```
10 ! CANDLE CANDLE BURNING BRIGHT
   (DECEMBER 1982 ANTIC PP. 52-54)
20 ! BY L.M. SCHREIBER (CONVERTED TO
   MICROSOFT BASIC BY H.CHAN & J.PERRON)
30 DIM OS(50,2),OJ(10,2),FLAMD(2,9)
40 FOR F=0 TO 2:FOR X=0 TO 9:READ FLAMD
   (F,X):NEXT:NEXT:! STORE FLAME DATA
41 DATA 16,8,12,28,62,62,28,24,8,4
42 DATA 8,4,6,12,60,60,28,48,16,8
43 DATA 32,16,24,56,30,30,12,12,4,2
70 GRAPHICS 7:! HI RES WITH TEXT WINDOW
80 OPTION PLM1:PMBASE=VARPTR(PLM1):
   ! TELL ANTIC WHERE PM BEGINS
90 POKE 559,62:POKE 53277,3:
   ! PM FOR SINGLE LINE RESOLUTION
100 POKE 704,104:! FLAME COLOR
110 POKE 705,200:! CANDLE CLR
120 POKE 706,120:! JAR COLR
130 POKE 708,154:! OXYGEN COLR
140 POKE 709,8:! COLOR OF DISH
160 COLOR 2:PLOT 100,75 TO 110,70
    TO 40,70 TO 50,75
170 POKE 765,2:FILL 50,75 TO 40,70
180 CANDLE=PMBASE+658:! LOCATION OF
    CANDLE IN PM MEMORY
190 FOR X=0 TO 25:READ B:POKE CANDLE+X,B:
    NEXT X:! READ IN DATA FOR CANDLE
200 POKE 53249,120:! PUT CANDLE ON SCREEN
210 FLAME=PMBASE+389:
    ! LOCATE FLAME IN PM MEM
220 JAR=PMBASE+838:! JAR IN P/M
230 POKE JAR,0:POKE JAR+1,255:
    FOR X=2 TO 48:POKE JAR+X,129:
    NEXT:POKE JAR+49,0:! DRAW THE JAR
240 POKE 53258,3:POKE 53250,107:
    ! PUT JAR ON SCREEN
250 COLOR 1:FOR X=1 TO 50:
    ! PUT OXYGEN ON SCREEN
260 C=RND(159):! COLUMN OF OXYGEN
270 R=RND(79):! ROW OF OXYGEN
280 IF C>60 AND C<90 THEN IF R>43
    THEN 270:! DON'T PLACE IT IN JAR
290 IF C>40 AND C<110 THEN IF R>69
    THEN 270:! OR ON SAUCER
300 OS(X,1)=C:OS(X,2)
    =R:! PLACE OXYGEN LOCATION IN ARRAY
310 PLOT C,R:NEXT:! DO IT 50 TIMES
320 FOR X=1 TO 10:! OXYGEN IN JAR
330 C=RND(22)+63:R=RND(22)
    +46:! AREA OF JAR
340 OJ(X,1)=C:OJ(X,2)
    =R:! PLACE IN JAR ARRAY
350 PLOT C,R:NEXT:OX=10:! DO IT 10 TIMES
360 POKE 752,1:PRINT
    "PRESS START TO MOVE JAR":PRINT:PRINT
    "PRESS SELECT TO LIGHT CANDLE";:
    ! INSTRUCTIONS
370 IF PEEK(53279)=7 THEN 400:
    ! NO KEY PRESSED - MOVE OXYGEN &
    FLAME IF LIT
380 POKE 77,0:IF PEEK
    (53279)=5 AND FL=0 AND JU=0
    THEN 410:! TURN OFF ATTRACT;
    LIGHT FLAME?
390 IF PEEK(53279)=6 THEN GOSUB
    430:IF JU=0 THEN COLOR 1:
    FOR X=1 TO 10:PLOT OJ(X,1),OJ
    (X,2):NEXT
400 IF FL=0 THEN GOSUB 540:GOTO 370:
    ! FLAME NOT LIT
410 FL=1:POKE 53248,120:
    GOSUB 520:! ANIMATE FLAME ON SCREEN
420 GOTO 370
430 IF JU=0 THEN FOR Q=0 TO 52:
    MOVE JAR+Q,JAR+Q+1,51:
    NEXT:JU=1:RETURN :
    ! MOVE JAR DOWN
440 FOR Q=52 TO 0 STEP -1:MOVE JAR+Q,
    JAR+Q-1,51:NEXT:JU=0:
    OX=10:RETURN :! MOVE JAR UP
500 REM DATA FOR CANDLE
510 DATA 8,8,12,28,28,30,62,62,
    126,126,126,126,126,126,126,126,126,
    126,126,126,126,126,126,126,126,126
520 F=RND(3)-1:
    ! PICK ONE OF THREE FLAME PATTERNS
530 FOR X=0 TO 9:POKE FLAME+X,FLAMD(F,X):
    NEXT:! USE SELECTED FLAME POSITION
539 ! DECREASE OXYGEN IF FLAME IS
    ON AND JAR DOWN.
    FLAME OUT WHEN NO OXYGEN
540 IF JU=1 AND FL=1 THEN COLOR 4:
    PLOT OJ(OX,1),OJ(OX,2):
    OX=OX-1:IF OX=0
    THEN FL=0:POKE 53248,0:RETURN
550 IF OX=0 THEN 580:! NO OXY IN JAR
560 FOR X=1 TO OX STEP 2:R=RND(22)+63:
    C=RND(22)+46:COLOR 4:PLOT OJ(X,1),
    OJ(X,2):OJ(X,1)=R:OJ(X,2)=C
570 COLOR 1:PLOT R,C:NEXT X
580 FOR X=1 TO 50 STEP 5:COLOR 4:PLOT OS
    (X,1),OS(X,2):C=
    RND(159):!GET NEW COLUMN
590 R=RND(79):IF C>60 AND C<90
    THEN IF R>43 THEN 590:! IN THE JAR
600 IF C>40 AND C<110 THEN IF R>69
    THEN 590:! ON THE SAUCER
610 OS(X,1)=C:OS(X,2)
    =R:COLOR 1:PLOT C,R:NEXT:RETURN
```

COMPUTER CAMPS

by DEBORAH BURNS

If you are trying to decide whether to send the kids to summer camp this year, the Atari-sponsored computer camps may be the answer. The first summer camps last year were so successful that Atari has expanded the 1983 program to seven locations across the country.

Boys and girls ages 10–16 may spend from two to eight weeks at the camps, which run from mid-June to mid-August. Each camp is designed to "give young people an opportunity to learn about computers, at whatever level, with an outstanding curriculum in an informal camp environment," according to Raymond E. Kassar, Atari chairman and chief executive officer.

The Atari Computer Camps provide the traditional summer camp experience with activities such as team sports, tennis, swimming, drama, aerobics, arts and crafts as well as computer education. Campers receive computer instructions at two sessions per day, six days a week, and during "free time" may choose to participate in the traditional activities or to work/play with the computers.



Atari has chosen seven beautiful sites for the '83 camps: New England (Greenfield, Massachusetts), Poconos (East Stroudsburg, Pennsylvania), Chesapeake (Glencoe, Maryland), Smokey Mountains (Asheville, North Carolina), Midwest (Faribault, Minnesota), Old West (Danville, California), and Pacific (San Diego, California).

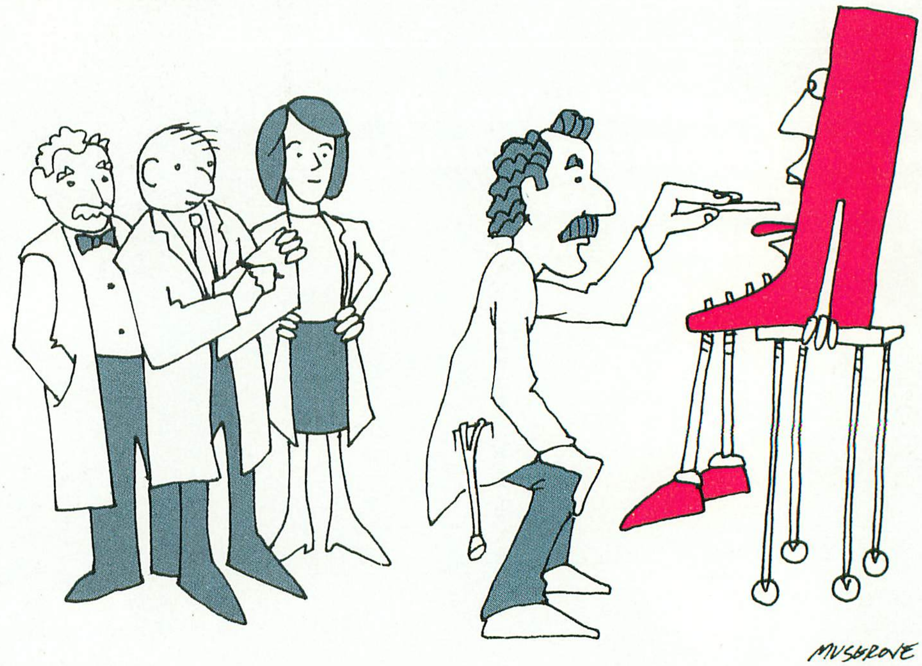
Each camp admits 96 children at a time. The computer education is directed by accredited school teachers assisted by graduate students in computer science. There are twelve ATARI systems per class, serving a group of 24 students. Other activities are supervised by experienced camp counselors.

"It's a unique way for children to be introduced to computer literacy," says Linda S. Gordon, Atari vice president — Special Projects. "Our experiences last year convinced us that something remarkable — almost magical — happens when you put children in this sort of learning environment."

Parents interested in signing up their children may contact ATARI COMPUTER CAMPS, 40 E. 34th Street, Department APT, New York, NY 10016 or call (800) 847-4180 (New York State and Canada call collect (212) 889-5200). The minimum stay in all camps is two weeks, which costs $890. Each additional week costs $425. A deposit of $100 is due when you sign up and the balance is payable on or before June 1.

ATARI CLINIC

by STEVE SWITZER



For most of us, Atari equipment is mystifying. We don't know what goes on inside, and usually we don't care — as long as it works. When it doesn't, we panic. It's a good practice to retrace the hookup of all plugs and switches when you have a malfunction, and reconfirm all software procedures. If that doesn't help, then you may have a hardware problem.

This month we introduce Atari Clinic, a column to assist you on the hardware side. It will be written by Steve Switzer. Steve is the owner/operator of Computer Support, an authorized ATARI service and repair facility, and of the Electronic Fantasy shops in the San Francisco Bay Area. He was one of the first retail dealers in the nation to carry ATARI computers and software. Send your problems and questions to Atari Clinic, c/o ANTIC, and we will forward them to him. Steve regrets he cannot answer replies personally, except through this column.

Q. My ATARI computer system experiences intermittent lock-up. There is no response from the keyboard, and control of the computer is gone.
A. If the problem only occurs in BASIC, then it is caused by a bug in the BASIC cartridge. The problem can only be fixed by powering the computer off and then on again. The problem with this is that you will lose any program that was in memory. It is a good idea to save the program you are writing after every half-hour or so. That way you won't lose everything.

If the problem occurs in a variety of operating situations, then the computer should be checked for dirty contacts on the Operating System board and all memory boards. If the problem persists, then you have component failure and it's time to take the computer in for service.

Q. I purchased my ATARI 800 with 32K. I added another 16K and have many problems. When working with the BASIC cart for about an hour, my 800 starts to transpose characters in the program, and randomly places various characters throughout the program. I called the ATARI service dealers. None had heard of this problem or knew what to do; however, they were willing to take the machine in and try to fix it. I am hesitant to hand over my 800 for trial-and-error experimentation. **Dave Fifelski, Ohio**
A. When you're working with computers which have a great number of chips inside, the only way to find the problem is to open the machine, get it to fail, and then swap out the chips until you find the bad one. In your case I would guess that replacing the ANTIC chip will solve your problems.

Q. How do I clean the head on my ATARI 810? Also, how often should I do it?
A. The head on your disk drive is a very sensitive piece of equipment and should be treated with great care. First of all, you should not use a cleaning disk; it can possibly ruin your head. The proper way to clean your head is with cleaning sticks (Radio Shack Cat. #44-1093A). Do not use Q-Tips because they have glue on them, and it's possible that a film would be left on the head. Do not take the top off your drive; work through the open door. Take a cleaning stick, dip it in rubbing (isopropyl) alcohol (do not saturate, just moisten lightly), and rub the cleaning stick across the head. Do not re-use the cleaning stick; throw it away. Let the head dry completely (about two or three minutes) before using drive.

Under normal usage the head should only have to be cleaned every four to six months, or every 200 hours.

Q. My ATARI 810 makes a lot of noise. Should I oil the carriage assembly that the head rides on?
A. No, no a thousand times no! On all drives made until Nov. 1982, the drive mechanism was supplied by M.P.I. They were loud and sounded like a Mack truck shifting gears. This is a normal sound. By oiling you are risking that some oil will get on the head. That will be the end of your head. To have your head replaced will cost you anywhere from $150–$250. At a cost like that, I don't think it's worth the risk. Also, if you just have to get into your drive, don't pry the drive case apart with a screwdriver. I know this sounds crazy, but I've seen people do it many times. If you want to get in it, take the round tabs off the top of the drive and use a Phillips screwdriver to loosen the screws.

PLAY BACK

Last of the schematics

by CARL EVANS

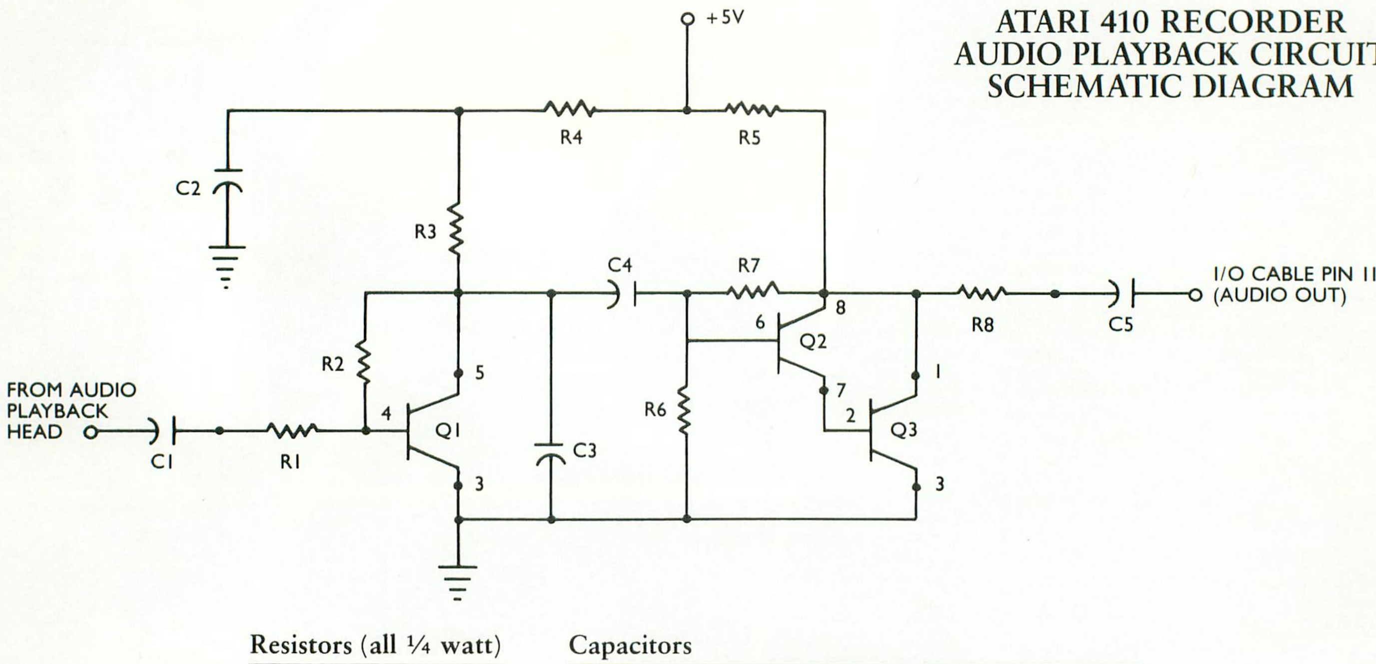
This is the last of the five-part series on the inner workings of the ATARI 410 Recorder. Last time I showed you the schematic for the digital playback circuit. This month we will look briefly at the audio playback circuit and I will show you the schematic for it. Next time we will start a new series of cassette file structures. That series will cover many topics, including a description of exactly what makes some commercial tapes "copy protected."

The audio playback circuit of the 410 Recorder is a simple, straightforward audio amplifier. Other than noting that it operates on the second stereo channel, there is nothing special about it. The circuit is more than adequate for the purposes for which it is intended.

The schematic shown here will come in handy if you ever have to troubleshoot and repair the audio portion of your recorder. The parts are common electronic components that you can buy at any local electronics supply store.

I am going to keep the article short this time to allow more room for responses to your letters. If you have any special cassette-related problem, write to me at this magazine and I will try to help you. Join me in the next issue as we explore the nature of cassette file structures.

ATARI 410 RECORDER
AUDIO PLAYBACK CIRCUIT
SCHEMATIC DIAGRAM



Resistors (all 1/4 watt)	
R1	1K
R2	150K
R3	10K
R4	470
R5	2.2K
R6,R7	1 Meg

Capacitors	
C1, C2, C5	4.7 UF, 35V (Radial Electrolytic)
C3	0.001 UF, 25V (Ceramic)
C4	0.1 UF, 25V (Ceramic)

Transistors (all in one IC)	
Q1,Q2,Q3	LM3086N IC



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It's true there aren't many companies that offer full-length courses in subjects other than reading and arithmetic, and what is offered seems to be drills, tests, games, or simulations. What you really want is a course that covers the subject with, say, 16 full-length lessons called tutorial programs, where you interact with an expert programmer backed by a staff of experts. That's exactly what we have.

ASK THESE QUESTIONS

Why haven't you heard of us before? We're a public company that's been trading over the counter for 16 years. We've been developing interactive learning systems since 1957. We sell hardware and software for interactive film, slide, video and computer learning to the educational field, vo-techs, industries, military, and several state and federal agencies. Our programs are used in all 50 states and even in some foreign countries! In 1975, we started to convert to the Talk & Teach Computer-Assisted Instruction (CAI) System, licensed Atari to use it in 1977, and in 1981 licensed Radio Shack to use our Talk/Tutor System. So, why haven't you heard of us? Frankly, we've kept a low profile. Until now.

Is there something wrong with our software? Well, we don't ask you to enter your name so we can drop it into some later text. We don't ask you to type in your answer and refuse to accept it if it's not spelled just right. And, we don't branch around a lot when you make an error. Our programs simply let you know if you're wrong by proceeding only when you select the right multiple-choice answer.

This proven learning-by-positive-reinforcement method lets you proceed quickly and smoothly through the programs, without a lot of cute tricks. But, if you're a devoted computerist or game freak you may be disappointed at the lack of motion in most of the pictures, or our special visual effects. We have some dandies, like the mushroom cloud that rises over Hiroshima in our History series, but your learning is not distracted by needless special effects.

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- For self-development, try a 16-program course in Economics or Psychology. Or Supervision, Sociology, Counseling (Personal, School, or Employee), Writing, Business, Philosophy, Government, World History, U.S. History, or Accounting.
- For vocational skills, study our 16-program courses in Electronics, Fluid Power, Auto Mechanics, Shop, Carpentry, Construction, Meat Processing, Military Skills (64 programs), and there are many more.

YOU HAVE WHAT IT TAKES

You'll need your Atari 400 or 800, and the Atari Cassette recorder. And to present the Talk & Teach programs you need the Educational System Master cartridge: it's **$25** from us, if you don't have one.

We say these courses, which are recorded one program per side of C20 to C30 (half hour) cassettes, are the equivalent of a chapter, or perhaps an hours lecture. We've been told that by studying our Economics or Psychology course, a student could pass a secondary or college test for credit. Many who have such credits never learned all that's in these courses. And while some of our courses have 1980 copyrights, most are 1981 and 1982. In U.S. History, for example, you'll learn about America's foreign policy during the Falklands crisis as well as that in the Mideast in 1982. And we're putting this information at your fingertips.

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Remember, these are all for your Atari! Yes, we've done programs for TRS80 Model I, III, Color, for the Apple and T. I. But that's another story.

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Tangle Angles

I have heard about loading cassettes at 1200 baud and even 2400 baud. I would appreciate more information.

Bill Creegan
Prescott, AZ

Several of you have asked about increasing the operational baud rate of the Atari cassette I/O. For reasons enumerated earlier, I recommend against trying to increase the baud rate. Cassette I/O at baud rates higher than 600 baud is not reliable. If you still want to try it yourself, then purchase Programmer's Work Shop, marketed by Synergistic Software, 830 N. Riverside Dr., Renton, WA 98055 (206-226-3216). This package contains a machine language routine to write cassettes at 900 baud. I purchased the program to test that routine, and it does increase the baud rate to 900. But, *I only got one good load out of thirty tries, using top-of-the-line audio tapes. The only way to improve this ratio is to use chrome tape, and that eats recorder heads. Sounds like a no-win proposition to me.*

I have a problem. My 410 will CLOAD only a few of my programs. Some were saved to cassette by me and others are third-party tapes such as Crossfire (which does load). Brand-new tapes have no chance.

I have taken good care of my 410. Heads are cleaned and good low-noise tape is used. I have had a technician work on the deck in hopes that this was a head realignment problem.

Bill Cenady

Cassettes can be frustrating at times. The only thing I can really suggest for your immediate problem is for you to try the HI-REL mod I discussed in ANTIC #7. I hope the new Atari 1010 Recorder will be designed the way the 410 should have been. The FSK decoding could have used phase-locked loops. In a coming issue of ANTIC I will analyse the new recorder.

I am having problems loading some cassette programs that I have *purchased*. I thought the problem was only with machine language programs but I even have had trouble with some tapes with BASIC programs.

I solved the problem on tapes that are not copyproof by borrowing a friend's new 410 cassette, loading the program into my ATARI 400, then copying it with my 410. Those cassettes will then load. However, I can't do this with cassettes that are protected.

Gerald P. Graham,
Associate Professor,
Longwood College, VA

Sounds like a misalignment of the recorder heads. First, make sure that they are properly aligned and if that doesn't help, then try the HI-REL mod I described in ANTIC #7.

Using a friend's recorder is effective, but a hassle. If you need to continue that, you might want a copy of a VERVAN program called CASDUP, marketed by IJG, Inc. (714-946-5805). That program will copy even difficult, multi-file, boot tapes. I haven't found anything that CASDUP 2.0 won't copy.

Atari Customer Service advised me that the 410 should be demagnetized about every six months; they said to take it to an Atari Service Center.

Could I not use the demagnetizer I have for my regular cassette recorder? It is a cassette with battery-powered demagnetizer built in. You insert the recorder, hit PLAY for one second, and the heads are demagnetized.

What if I insert this in the 410, CLOAD, hit Return, and hit Stop/Eject after one second? Might this harm my 800?

Larry A. Campbell
St. Louis, MO

Degaussing (demagnetizing) tape heads is controversial in the recording industry. I believe that it does more harm than good, and recommend that you clean *the tape heads once every 100 hours per your user's manual, but I recommend against ever using a degausser on your recorder.*

I have seen laboratory cases where the residual magnetic field in a record head was actually higher after a so-called degausser was used on it. Also, if a fault should develop in the degausser, it is possible to zap your circuits with several thousand volts (albeit low current). Potentially, this could wipe out your recorder, and your computer as well.

If you insist upon using such a device, unplug your recorder from the wall outlet and remove the I/O cable that goes to your computer.

After six hours of typing, I think I ruined the ending frequency of the program by rewinding (by mistake), and

continued on page 78

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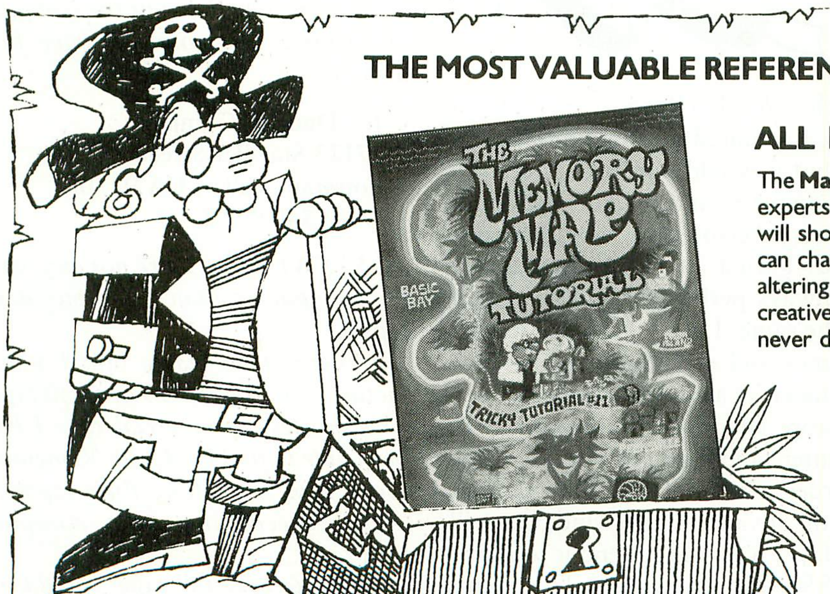
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recording over the top of the last little bit. If I knew the frequency (Hz) of the "CSAVE" ending, I could run that +, POKE the RUN C (as in your column) and salvage the whole mess. What think?

T.S. Tomingas
Pacific Grove, CA

I don't understand exactly what you mean, but I have some general advice.

Whenever you are writing, editing, or simply typing-in a program of any length, you should periodically save what you have done. There are bugs in the BASIC cartridge program that can cause the computer to freeze up, thus destroying everything.

When I am writing a program I create a backup system as follows. I label three tapes 'ONE,' 'TWO,' and 'THREE.' After I have worked for an hour I dump it to tape ONE. About an hour later I dump the current version to tape TWO, and an hour later I dump the latest version to tape THREE. Then I start the sequence all over again with tape ONE. This way I never lose more than an hour's worth of work at any one time.

As soon as I have finished debugging the program I write a copy on both sides of tape ONE and break the write protect tabs on the cassette. I simply erase tapes TWO and THREE for later use.

I teach at the Lelean Memorial School in Fiji, and use an ATARI in class. We have such trouble with the 410 Recorder! I've tried CSAVE and LIST C, and now stick to the latter, since at least I don't lose the memory.

In class cassette loading is *so* slow. Can the 410 be speeded up? Finally, I've heard that the cassette tape can be used to give verbal instructions controlled by the program. How do you do this?

Rob Pattison
Nausori, Fiji

I am surprised and pleased to hear from a reader so far away. I encourage letters from readers outside the US (just to see how far my articles are reaching)!

You have the same problems with the 410 Recorder that we all have. You might try the HI-REL mod I described in ANTIC #7.

Your second question asks how to increase the baud rate of the cassette I/O. You can increase the baud rate to about 900 by installing a machine-language program that will replace the OS-resident cassette handler. But don't *do it! The only way to obtain any kind of reliability at such a high baud rate, on this computer, is to use chrome tape, and chrome tape requires special heads which the 410 doesn't have. If you use chrome tape with the 410, you will rapidly destroy the heads.*

Your third question has a happier answer. Add a voice track to your cassette programs with a standard stereo recorder that has separate record controls for each track. See De Re ATARI *(available from Atari, Inc.) and articles in ANTIC #4 and computer magazines. One of these days I will write a column on the subject.*

I purchased a 410 Recorder and used it rarely. I acquired a program on a cassette but it would not load. The footage counter would advance to about '9' then an error code would be displayed. I tried an older cassette that had always performed and the result was the same. I tried various places on the tapes and eventually got no tape movement at all. The local Atari service store checked it with a different computer and assured me that the Recorder was defective. The recorder will still advance and rewind, but will not play. I was told to send it to Atari, plus $50, for a new one. This seems like a rip-off to me.

Fred Godar
Florissant, MO

The most likely cause of the problem is a bad switch under the PLAY button. The switch is a simple mechanical one that may be bent or broken. If it is bent, you might be able to 'un-bend' it. If the bar is broken, then you should replace it. Look in my last column (ANTIC #6) *for a good source for parts.*

If you have a high school in the area that offers a computer programming course, you might be able to order blank tapes from the teacher. Schools order in large quantities. I pay $1.00 for blank tape and plastic storage box.

Bonnie Plagge
Hebron, KY

I can't find short audio tapes by a reputable manufacturer. The C-10's I found are garbage. I've turned to Maxwell C-46s (low noise). Would it be better to use U.D. tapes? Is the C-46 too long for short programs, in terms of tape stretch?

Geoff Campbell
Simi, CA

You can obtain good C-10 and C-20 cassettes at most good computer stores. If you don't have one near you, several are advertized in the computer magazines. The source I have been using is:

Joe Duetsch Company
17173 Staedler Street
Fountain Valley, CA 92708
(714) 540-2772

MAXWELL 'UD' are not any better for computers than the 'low noise' tapes.

I know of no 'name brand' manufacturer who sells C-10 or C-20 tapes. The shortest commercial tape I have been able to find is a C-30. Remember, those guys are selling their tapes for 'music' recording, not computer programs.

A C-46 cassette tape should not exhibit any tape-stretch problem. That kind of problem usually only occurs on C-90 and C-120 cassettes.

TELETARI

Don't Ask
2265 Westwood Bl., Ste. B-150
Los Angeles, CA 90064
(213) 475-4583 or 397-8811
$39.95, 32K — disk (req. BASIC)

Reviewed by David Duberman

TeleTari from Don't Ask Software is the first terminal program for the ATARI that supports the Bit 3, Full-View 80, 80-column board. In addition, TeleTari is a highly adaptable telecommunications package. It's advertised as "The Friendly Terminal," an appropriate term.

After booting the program disk, the main menu appears. It prompts you to choose from among such options as Online, Save, Load, Review, and Terminal Parameters.

The Review option, as in several such programs, prints the contents of TeleTari's buffer to the screen. A superior feature of TeleTari's Review option is that you can use the arrow keys to page forward or backward through the buffer. This allows you to find selected portions of the buffer's contents quickly. You can also print selected portions of the buffer using the [OPTION] key during review.

The Print option sends the contents of the buffer to the printer at machine language speed. Thus, if your printer has a large enough buffer, you can go back online almost immediately while the printer prints what is in its buffer.

When first seeing the Terminal Parameters menu, a beginner in telecommunications might justly feel intimidated. There are many parameters to set, and a myriad of combinations of settings. Reading the manual should answer most, if not all questions. The manual includes clear and accurate information on how to set terminal parameters for various communications tasks. Also, you may save a custom set of terminal parameters (say, for a special application) to a disk file. You can save as many as ten different sets of parameters on one disk. The program comes with three custom sets for commonly used communications applications.

One of the manual's best features is the section on transferring programs. For one who has never uploaded or downloaded, the process can seem formidable. TeleTari's manual takes you by the hand and leads you through the procedure of transferring files. If you've never received a program by downloading from a bulletin board, or sent one to a friend by uploading, you've missed half the fun of telecommunications.

Finally, the manual contains as an appendix an eight-page list of Public Access Message Systems. With these numbers and TeleTari, you can log on to free (for the cost of the phone call) bulletin boards all over the country, leave messages, download programs, and generally have a whale of a time with your ATARI.

BASIC A +

Optimized Systems Software
10379 Landsdale Avenue
Cupertino, CA 95014
(408) 446-3099
$80.00

Reviewed by Richard E. DeVore

For those of you who wish for a BASIC with more power than the Atari 8K version but don't want to move to Microsoft BASIC because of incompatibility, here is a solution to your

problem. All you need is a disk drive and at least 32K of memory to begin using **BASIC A+**. It is a disk-based machine language version of the BASIC language and is compatible with ATARI BASIC.

ATARI BASIC programs will run with BASIC A+ because the firm now known as Optimized Systems Software, Inc. originally wrote ATARI BASIC. The original version was designed to take up limited space and therefore has limited features. It also had some bugs which were discovered after the ROMs had been ordered, and they have not yet been removed. OSS addressed these problems and came up with BASIC A+. Although the language uses much more memory, with a 48K computer you still have approximately 23K to produce a program.

The documentation is supplied, not as a complete manual, but as a supplement to Atari's BASIC reference manual, which makes owning that book essential. After some cutting and pasting, you can have a manual which is complete and accurate. I assume the reason for this method of documentation is because A+ is an extended version of ATARI BASIC and that eliminates copyright problems. I would prefer, however, to get a complete manual with the product.

BASIC A+ provides many new statements which will make things easier and quicker. The main difference between it and Microsoft BASIC is in string handling. BASIC A+ supports PRINT USING which allows money fields to be right-justified as well as allowing a "floating" dollar sign, padding blank digits with asterisks, padding blank digits with zeros as well as string formatting. You may have prompts included in INPUT statements, while LVAR lists all variables for you. Other valuable debugging tools are TRACE and TRACEOFF which allow you to choose a display of the line numbers as a program executes.

If you haven't yet memorized the error codes, having them show up on the screen in English is very handy. Also, certain commands that required DOS can be called up without waiting for "MEMSAV" to execute. Among these are: DIR, RENAME, PROTECT & UNPROTECT.

Other features that save time and effort are BGET and BPUT, RGET and RPUT instead of just GET and PUT. The B stands for block while R stands for record. These four statements can definitely speed up your work.

Player/Missile Graphics can be accessed by commands such as PMG which sets up your memory requirements, while PMMOVE will position a player anywhere on the screen. PMADR will return the memory location of a player, and PMCOLOR makes setting a player's colors simpler. PMWIDTH allows setting the width of a player and PMCLR will clear. The BUMP command reads the collision registers, i.e. BUMP(1,4) will look for a collision between player 1 and player 4. In fact, they devote 14 pages in the manual to explaining the enhanced Player/Missile Graphics!

BASIC A+ now comes with OS/A+ and EASMD (an Editor Assembler) at no extra cost. This is frosting on the cake, because BASIC A+ alone is well worth the price. For anyone who wishes to use a powerful BASIC while still remaining compatible with ATARI BASIC, this is the way to go!

HELLCAT ACE

MicroProse
One Caribou Court
Parkton, MD 21120
(301) 357-4739
$29.95, 32K — cassette
$29.95, 40K — diskette

Reviewed by David Plotkin

Hellcat Ace, released by newcomer MicroProse Software, is the first real-time flight simulator for the ATARI home computers. While the graphics are not stunning, the game plays well and holds your interest with multiple skill levels and a variety of scenarios. It requires the BASIC cartridge as well as two joysticks.

Hellcat Ace is an air-combat simulator, set in the Pacific theatre during World War II. You are the pilot of a Hellcat fighter, the U.S. Navy's best carrier-based fighter through most of the war. Your opponents are Japanese aircraft, both fighters and bombers. Through the front cockpit window you can see the sky and ocean. Below the cockpit view is a full instrument panel showing altitude, engine power, fuel, and rounds of ammunition remaining. A rear view mirror is also provided so that you can tell when your enemy is on your tail.

As Hellcat begins, you are given a choice from about twenty scenarios of famous Pacific battles. Such events as Wake Island, Midway, Leyte Gulf, and the Marianas' "Turkey Shoot" are included. Once you pick a scenario, you will be faced with that screen first, and if you survive it, move on to the next one. You can then pick the level of difficulty as well as choose to face one or two enemy aircraft. Shooting down the enemy aircraft ends the scenario, increases your score and number of "kills", and moves you on to the next screen. A brief description of your mission comes up on the monitor before the next screen begins. Allowing enemy aircraft to shoot you down ends the game, although you have a chance to ditch your aircraft or bail out.

Your Hellcat fighter is controlled using a joystick plugged into slot 1. If you plug a joystick into slot 2, it controls the throttle (power) to the engine. The simulator flies very well, turning and banking realistically. As you bank the plane left and right, the sky / ocean interface tilts, just as it would in a real aircraft. Pulling back on the stick causes the plane to climb, and pushing the stick forward causes the plane to dive.

Aircraft velocity is also handled well. The plane gains speed as the altimeter unwinds in a dive, and you can "stall" your plane if you try to climb too steeply with too little engine power. A stall (fast loss in altitude and drop of the nose with resulting increase in speed) can be a good way to shake an enemy fighter from your tail. Fancy aerobatics are easily done; loops, barrel rolls, split "S" and Immelman turns are all possible and described in the instruction manual.

The fire button on the joystick plugged into slot 1 fires short bursts from your wing-mounted machine guns. Although there is a gunsight cursor, the instructions warn you that this is a manual gunsight, so you must correct for the effects of gravity, plane velocity, etc. You do get the feel of how to aim after awhile, but be prepared to waste a lot of ammunition at first. Multiple hits on the enemy aircraft are necessary to destroy it, and the number of hits required increases at the higher skill levels. The enemy aircraft may turn and attack you, generally from a head-on direction, although if he stays on your tail long enough he can also shoot you down from behind. If you are hit, you hear some loud bangs, the screen flickers, and then you spin. Better luck next time! The instructions say you can bail out by pressing the fire button on the throttle joystick, but I've never succeeded.

The enemy aircraft are single-color players, which change size and shape with their distance and orientation. It can be difficult to determine the enemy's intentions at long range due to the lack of color and definition of the enemy aircraft. It can also be difficult to tell that the enemy is firing at you until it is too late. While I suppose that this situation may simulate real life, I think an enhancement in the graphics of the enemy aircraft would improve this game.

For instance, the successful destruction of the enemy aircraft is somewhat anticlimatic. Rather than a brilliant explosion or spinning off the screen, the aircraft simply disappears with a bang, leaving behind a few bits of debris.

All in all, Hellcat Ace is an effective flight / combat simulator, responding smoothly to the joystick, and with enough varying difficulty to interest both the novice and the professional pilot (it was play tested by members of an Air National Guard Wing). While the graphics could be improved, the playability of the game is not harmed by this, and I recommend it to those of you with dreams of glory and the big blue yonder.

Fancy aerobatics are easily done; loops, barrel rolls, split "S" and Immelman turns are all possible.

ATARIWRITER

Atari, Inc.
1265 Borregas Ave.
Sunnyvale, CA 94086
(408) 745-4636
(800) 538-8543 (outside California)
(800) 672-1404 (inside California)
$79.95, 16K - cartridge

Reviewed by Mike Dunn

Atari has now released a new word processor, the **AtariWriter**, a 16K, ROM-based program for less than $100, that combines the best features of the others. It can be used with either a cassette or disk system at a price that is hard to beat. The program is very easy to use and comes with an excellent instruction book.

When you plug in the cartridge and turn the computer on, you see the Atari symbol, then the menu. Choices are: Create File, Delete File, Edit File, Format Disk, Index of Disk Files, Load File, Print File and Save File. To begin your text, you choose Create and are greeted with the edit screen. On the top of your screen are the file-formatting commands and their defaults, which are easily changed. These include the top, bottom, left and right margins, page length, paragraph and line spacing, paragraph indentation, justification on and off, and print style. On the bottom of the screen are arrows indicating the various tab spacing, the current line and character location and the prompt for return to menu. In any part of the program there are always prompts to tell you what to do next, and on many commands, a Y or N is required to make sure you want to carry it out. The error trapping is so excellent that lost files and mistakes are almost impossible.

All the usual Atari editing commands are available, as well as the ability to go up or down an entire screen at a time and go to the beginning or end of a line. You can delete characters, lines or a block of lines. The best feature is the ability to restore the deleted text if you change your mind! This is done by storing the deleted text in a buffer in case you need it.

Text can be moved around, and you can search and replace text easily. You can instantly go to the top or the bottom of the file. However, when editing, only *insert* mode is available, which means you must delete unwanted text because you cannot type over it. This is a minor annoyance. The speed that the program can do all of this is impressive. There are no delays, all is instantaneous. The other word processors take much longer to do the same.

When you have finished your masterpiece, you can save it in DOS format or print it. You can preview it on the screen at the width you specify, using your 40-column screen as a window to quickly scroll horizontally. You can even right-justify your text on the screen, and specify the page you wish to preview.

AtariWriter can directly support all of the Atari printers, including the new Atari 1025 (made by Okidata).

APX (Atari Program Exchange) will be selling printer drivers for other popular printers, but you can use imbedded printer commands in your text by using the ASCII decimal number. With or without the printer driver, you are able to center text, double-column print, use elongated or various print sizes, use headers and footers, right-justify monospaced print, number pages, use sub- and super-scripts, print a specific page and make multiple copies.

AtariWriter is the best non-game program Atari has released. The features it lacks, and that I miss, are the inability to type over text; the absence of user-made printer drivers (especially if APX doesn't make a printer driver for your printer); and the lack of database merge. Compared to the other word processors available, it is clearly superior on price and performance to Text Wizard and the Atari Word Processor.

Letter Perfect is still a strong contender, as LJK is currently working on an upgrade that will have many more features, including the adjustment of dot-spaces for various proportional fonts, with a disk full of printer drivers included. Letter Perfect also can merge with DataPerfect, LJK's excellent database system. This is a capability that AtariWriter and other word processors lack. But for most people, the AtariWriter should satisfy their needs very well at a very attractive price.

Advantages

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ABC

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Reviewed by Jerry White

Attention: ATARI BASIC programmers. We have finally found an excellent compiler for ATARI BASIC! **A BASIC Compiler (ABC)** can make your ATARI BASIC programs run from four to twelve times faster and possibly use less memory. If you have at least 40K of RAM and one disk drive, read on.

ABC reads tokenized ATARI BASIC programs from diskette, translates into P-code, then writes a compiled runtime version onto diskette. To use the compiled version of your program, you simply remove your ATARI BASIC cartridge, and binary load it from DOS 2.0S.

To insure that the compiled version is relocatable and will run under various system configurations, you simply compile a second time using a different load address, then run a second program that will generate completely relocatable code. If you are simply compiling programs for your own personal use, these two steps are not required.

The speed and size of your compiled program will vary depending on the condition of your original program. During extensive testing, I found that the compiled program was always considerably faster and used less memory than the original on my 48K system. As a general rule, the increase in speed and decrease in RAM usage will be greater in large programs. On a 48K system, about 4K of the cartridge area is recovered since the compiled programs run with no cartridge present. On systems of less than 48K, compiled programs may or may not require less than 48K, compiled programs may or may not require more RAM than the original BASIC version. This will vary from program to program.

To provide an example for this review, I chose a program called Masher from APX. Masher is a BASIC program compactor designed to decrease the RAM requirements of your BASIC programs. It is one of the slowest running programs imaginable. Although it occupies only 41 sectors on the diskette, Masher requires 32K RAM, due in part to its extensive use of arrays. The compiled version of Masher uses approximately 7.5K less RAM on my 48K system, and runs an average of 5.2 times faster. In the majority of the other programs I compiled, the RAM savings were not as great, but the increase in speed was greater.

Much of the increased speed is due to the elimination of floating-point math. If your program uses floating-point, you will have to change it so that you use integers only. ABC permits 3 byte integers and the range between a negative and a positive eight million.

The well-written, 20-page ABC manual provides examples to show you how to convert from floating-point to integer routines. The lack of floating-point math prevents the use of the following functions: ATN, CLOG, COS, EXP, LOG, RND, SIN, SQR. Fortunately these functions can be simulated. For example, the following routines will both return a random number from 0 to 3. The first example would not be permitted since the RND instruction is not accepted by the compiler. The second example would provide the same result without using RND.

```
Example 1: RAND = INT(RND(0)*4)
Example 2:
RAND = INT(PEEK(53770)*4/256)
```

Since the compiled version of your program runs without the BASIC cartridge, you will also have to live without a few other commands. I found this to be a small price to pay in return for the speed and efficiency of a compiled program. You will have to remove the following commands from your programs before you compile: LIST, BYE, DEG, LOAD, RAD, DOS, CSAVE, ENTER, CONT, NEW, SAVE, RUN, LPRINT, CLOAD.

Since a compiled program will execute much faster than the original BASIC version, you can be reasonably certain that you will have to make at least some changes in most programs. Sound loops may require adjustment because sound changes drastically depending on duration.

By now I should have made my point. You can't just compile your existing BASIC programs and expect to get the desired results. You must start with a bug-free program that does not rely on quirks in the BASIC cartridge, avoid the use of floating-point routines and unsupported functions, and make the necessary timing adjustments. Once your program has been compiled, it runs as if it were written in "C" or "FORTH", and you get "protected" or unreadable code as a bonus.

I found ABC to be quite friendly and easy to use. I highly recommend it to professional software developers and hobbyists alike.

At the time of this writing, I was told that some pre-release, unprotected copies of ABC were being circulated. This is most unfortunate since it may be harmful to the sales of this fine product, and because the pre-release version was not yet bug-free. I urge you to purchase ABC in order to insure vendor support and error-free computing. ABC is well worth its $69.95 price tag.

STRIP POKER

Artworx Software
150 North Main St.
Fairport, NY 14450
(800) 828-6573
40K — diskette
$34.95 (master)
$24.95 (data disk)

Reviewed by Steve Randall

"At last — a computer card-simulation game with a real payoff!" exclaims Larry Liberal, entertainment writer for a large East Coast newspaper.

"Trash," retorts Frank Fundamentalist, evangelical preacher with roots deep in the great Midwest. "Its only appeal is to the prurient interest of the participants, nothing else," continues Frank.

"Nothing else?!" cries Larry. "How about the challenge of having to outplay either of the two lovely opponents at a hot game of five card draw poker? It's *not* just like opening the pages of certain magazines. There's strategy and luck involved in order to win."

When the selection screen boots up, we have to decide which voluptuous woman will be our opponent this round. While mulling over our choice, the program plays a few musical bars which remind us of that pop hit from a few years back — "The Stripper". This round we choose Melissa instead of Suzi, and the top half of the screen fills with an excellent Graphics 7.5 drawing of a reclining, fully-clothed generously-proportioned young woman.

"Sexists!" shouts Flora Feminist. "Why aren't there men available for the women?"

"There are," Larry says. "The manufacturer has made two additional data disks available that include both sexes."

As the game continues, the player must win $100 to get the woman to remove one article of clothing. If she wins back part of the hundred, she may put the same piece of clothing back on. This can be *most* discouraging, and here is where the strategy of play can be really critical.

The women play fairly good poker except for occasionally drawing two cards to a flush. (You wouldn't want them to play too well, would you?) In order to totally disrobe your opponent, you must amass $400. Total nudity of the women is the big payoff in **Strip Poker** and certainly gives you an added appreciation of the ATARI's *graphic* capabilities!

All giggles aside, the execution of Strip Poker is very good. The interaction with the player is excellent. The game is completed controlled by a joystick (once you've selected your opponent), and after two or three hands you should have no problems playing. Naturally, your success depends on your poker skills.

Is Strip Poker for you? That depends on whether you agree with Larry, Frank or Flora. As for me — "Whose turn is it to bet . . . ?"

THE BASIC COMPILER

Datasoft
9421 Winnetka Ave.
Chatsworth, CA 91311
(213) 701-5161
$99.95, 48K — disk

Reviewed by David Duberman

A compiler is a program that converts some other program, one that is written in a high-level language such as BASIC, into machine language. This results in a program that runs much faster than the original. Until recently, BASIC has only been available in *interpreted* versions for the ATARI, for example ATARI BASIC, Atari Microsoft BASIC, and BASIC A+. These BASICs must convert each line of a running program to machine language every time the line is executed. As a result, speed is hampered by the interpreter.

Datasoft's **BASIC Compiler** also converts each line of a BASIC program to machine language, but only once. It does this by creating an *object* (machine-language) file and writing it to disk. This converted program will then run automatically after a binary load, using the 'L' option from DOS.

Many people have favorite software written in BASIC that runs too slowly. For instance, there are some great public-domain databases available that can easily be customized to your exact requirements. Unfortunately, these do searches and sorts quite sluggishly, because they are written entirely in BASIC. Using the BASIC Compiler, such programs run up to 15 times faster.

Elimination of the interpretation step is one key to the speed of a compiled program. Another is that integer arithmetic can be used instead of floating-point. ATARI BASIC uses floating-point, and it may be retained in a compilation, but with some sacrifice of speed. It is only about three times faster than interpreted BASIC, as opposed to 15 times faster using integer arithmetic. If floating-point is used, there are a few restrictions on the BASIC source program. Complex system commands (e.g. LOAD, ENTER, SAVE, LIST) are prohibited in the program, though RUN is allowed. *All other keywords are allowed*, unlike some other compilers that only allow a few keywords.

DATA statements must be placed at the end of the BASIC source program. This is not a problem, because it doesn't matter where in the program the DATA statements occur as long as their original order is preserved, and RESTORE statements are renumbered accordingly. The ATARI screen editor is ideal for renumbering DATA lines to the end of the program, and then deleting them from their original positions.

Also, FOR loops must have only one NEXT. For example:

```
200 FOR I=1 TO 4:READ A:
    IF A=255 THEN NEXT I
210 ARRAY(I)=A:NEXT I
```

will cause the compiler to issue an error message upon encountering the second "NEXT I". There are a few other minor restrictions involving string manipulations and variable line references (e.g., no "GOSUB 100+X"). These are easily circumvented with assistance from the manual.

If integer arithmetic is used by the compiled program, the above restrictions apply, plus a few more. First, calls to the floating-point transcendental functions such as SQR, LOG, COS, etc. are not allowed. The RND function takes the form:

```
RND(X)
```

and returns an integer between 0 and X–1 inclusive. This form of the random function is actually easier to use than the ATARI BASIC version, i.e. INT(X*RND(0)). In addition, with integer arithmetic, no numbers having fractional parts may appear in the program. Also, your program must not generate any numeric value outside the range of –32768 to 32767, although PEEKs and POKEs outside this range still work. If your program does contain any fractional values or transcendental routines which can't be altered, a compiled program using floating-point arithmetic still offers a significant increase in speed.

Compilation is fairly simple, especially if you follow the excellent instructions accompanying the program. On a single-drive system, a BASIC program of up to 100 sectors may be compiled, and the capacity increases with a multi-drive system. Once you have ensured that the program fits the necessary specifications, and that the original version executes properly, the compiler functions automatically, with little or no assistance necessary on the part of the user.

The compiler is a machine-language program that reads your BASIC program from disk in tokenized form and creates Assembly Language files from it on disk. An Assembler is then loaded, which translates the Assembly Language files to binary and creates the final object file. Compilation takes four passes. During the process, a run-time package of machine-language routines is added to the program. This is used by the compiled BASIC program as it executes. If errors occur during compilation, a message appears on the screen giving the options to continue the process or abort. In the latter case, control is passed to DOS.

Once compilation is complete you are given the option of printing a "line map" to disk, screen, or printer. This invaluable reference lists all the line numbers of the original BASIC program and shows the memory locations where corresponding machine-language instructions reside. I strongly urge you to use this option every time

you compile a program, for the following reason. If a run-time error is generated by the compiled program, the run stops and an error message appears. This contains an ATARI BASIC error message number and a trace of addresses (in decimal) which shows the sequence of subroutine calls preceding the error. In addition, the option prompts you for a run address so you can restart the program from anyplace in memory without having to reboot, as is usually the case when an error occurs in a machine-language program.

I tested this program by compiling a public domain maze chase game. The original runs very slowly, partly because of the fairly clumsy code, but mostly because of the BASIC interpreter and the floating-point arithmetic employed by ATARI BASIC. The original BASIC program occupied 77 sectors, took about 20 seconds to initialize, and about 17 seconds to move a player across the screen with the joystick. Only one change in the program was necessary for compilation, an easily altered RND function. The program compiled in about ten minutes and generated an object file of 133 sectors in size. The compiled game now takes about *one second* to initialize, and the player moves so fast that accurate control is impossible. It's entirely fair to say that the increase in speed of a compiled program using integer arithmetic is astonishing.

TELE-TALK

Datasoft
9421 Winnetka Ave.
Chatsworth, CA 91311
(213) 701-5161
(800) 423-5916 (orders)
$49.95

Reviewed by Richard Kalagher

Would you like a terminal program that allows you to change the screen color when your eyes get tired? How about being able to type into a text window at the same time you are receiving data, then sending the text window to the remote computer by just pressing RETURN? Or would you like a continuous display of the current time, how long you have been connected and how much it has cost you for connect time? All of these features and many more are available in Datasoft's new **TELE-TALK** program.

TELE-TALK has not been heavily advertised and I have not seen it at many local computer stores, but it is certainly one of the most powerful terminal programs available for the ATARI. I have been using it for several months to communicate with both time sharing services and local bulletin boards. The more I use TELE-TALK, the more I appreciate the many features in this program. First of all, it is written in machine language, making it faster and more responsive than terminal programs written in BASIC. The program is menu-driven, so you do not need to remember any commands. The menus are set up so that you can perform most functions in one or two keystrokes.

The main menu allows you to set the time; read, clear or spool the text buffer to disk, cassette, or printer; upload or download; and perform DOS-like functions such as viewing the disk directory or renaming, deleting, locking and unlocking files. One interesting menu item called EDIT OPTION KEYS allows you to enter and save up to ten separate lines of text. These lines can be transmitted when you are in command mode by simply pressing the OPTION key simultaneously with one digit from 0 to 9. This is very useful for sending log-on codes, passwords, telephone dialing commands to programmable modems, or any commonly sent phrases.

A second major menu allows you to modify the port configuration. It contains a list of eighteen items ranging from parameters such as port number and baud rate, to exotic things like showing control characters and turning word wrap on and off. (Yes, there is a word wrap feature just like in word processing programs!) This menu is very easy to use. The vertical cursor arrows are used to select one of the eighteen items, while the horizontal arrows are used to select all legal values for each of these items. Pressing "D" will automatically set all of these parameters to their default values. By the way, I have found that the default values have worked fine for all of the connections I have made.

Once you have changed all of the parameter values you want and entered text into the EDIT OPTION KEYS, you can save your custom program to a disk file that can be loaded whenever you want this same configuration. In fact, if you name the file DEFT.PRO and save it on the original disk, it will load automatically when you boot TELE-TALK. This file is only three disk sectors long, so loading it only takes a second or two.

You can choose to continuously save text in a buffer or turn the SAVE TEXT feature on and off when you want. A horizontal line at the top of the screen changes color from left to right as the buffer fills. This is a very handy feature since you can see at a glance what portion of your buffer is empty. When the buffer is full, TELE-TALK automatically tells the remote computer to stop transmitting, and switches you to the main menu so you can save and/or clear the buffer. TELE-TALK also lets you review the buffer on the screen at any time. Reviewing or saving the buffer does not automatically clear it, so you can make several copies.

TELE-TALK comes with a well written, 16-page manual which fully explains how to use the program and gives you a number of helpful hints.



NOBODY EVER PLAYS JUST ONE HAND OF STRIP POKER.

There's no such thing as a quick game of *Strip Poker.* With two captivating female opponents, this fast-paced program features graphics and game play so realistic that players tend to lose track of time. Decorum forbids that we actually show you what happens on the screen. Suffice it to say that our sophisticated software gives you ample incentive to stretch your poker skills to the limit!

Just to sweeten the pot, we've added two new data disks . . . one with two new female opponents, the other with two males. The action is intense and the stakes are high.

**Apple Data Disks available 4/1/83. Apple and Atari are registered trademarks.*

If you have a keen competitive instinct and don't mind occasionally losing your shirt, see your local computer store or call us for *Strip Poker* today.

Atari (40K) and Apple II (48K) computers, $34.95 Diskette. Additional Data Disks (specify male or female) $24.95 ea.*

Look for these and other Artworx programs at your local computer store. For a free catalog, write or call 800-828-6573. Artworx Software Co., Inc., 150 North Main St., Fairport, NY 14450 (716) 425-2833



Artworx™

So you can play.

PUBLIC DOMAIN SOFTWARE

ANTIC is pleased to offer a library of Public Domain Software for the ATARI computers currently comprised of nine disks. These programs are not yet available on cassette. These disks contain unprotected material from the libraries of ATARI users' groups from around the country. There are three disks of games, two disks of graphics and sound demos, and one disk containing a number of digitized photographs. Also, there are two disks of utilities, and one disk containing music files requiring the Music Composer cartridge.

The potential buyer should note that these programs are sold *as is*. Their usefulness may depend on your experience with the computer. They may contain programming quirks that require some modification. However, all perform reasonably well. Contents of the disks may vary slightly from the published description due to unforeseen circumstances, but each disk is filled to reasonable capacity with useful programs of the kind described, and represent an excellent value at $10.00 each, plus $1.50 per order in U.S. funds for shipping/handling. Send check or money order (payable to ANTIC Publishing), and disk number(s) to: **Public Domain Software, 600 18th Street, San Francisco, CA 94107.** Allow four weeks for delivery. All orders are sent by First-Class Mail. Please add 6½% sales tax for California residents.

ANTIC GAMES DISK #1

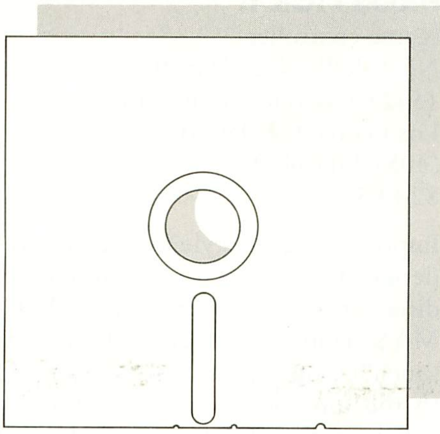
1. Chicken: a great game from ANTIC #1
2. Hangman: the traditional word game
3. Creation: a version of Life
4. Reverse: order of string numbers
5. Monopoly: computerized!
6. Lunar lander: select terrain (stick)
7. Escape: guide ships thru maze (stick)
8. Zonex: hidden color patterns in grid
9. Clewso: detective adventure, graphics

ANTIC GAMES DISK #2

1. Speed Demon: from ANTIC #4
2. Guy's Grid Game
3. Deathstar: from ANTIC #2
4. Blackjack: Vegas rules
5. Civil War: a strategic simulation
6. Artillery: firing strategy game
7. Super Wumpus: text adventure
8. Reckless Driving: avoid collisions (stick)

ANTIC UTILITY DISK #1

1. Doc: program allows you to accompany programs with separate documentation on disk
2. Microassembler: allows you to create USR routines-assembler, more
3. Assembler-Editor: BASIC, slow but versatile
4. Num: automatic line numbering utility in BASIC
5. Memtest: runs without BASIC cartridge, to test all memory
6. Pattern: graphics demo, documented
7. Color: 128 colors at once
8. Printnop: connect parallel printer from jacks 3 & 4



ANTIC UTILITIES DISK #2

1. Bubble Sort: from ANTIC #4
2. Typo: from ANTIC #3
3. Home inventory
4. KEY 6: Cipher coding
5. Renumber
6. Compare: listings for differences
7. SUPER: menu
8. Disk label
9. Modem
10. RT clock & more

ANTIC GRAPHICS DEMO #1

1. Spider: from ANTIC #3
2. Moire
3. Rainbow
4. Horses
5. ATARI logo
6. Pallette
7. Oxygen
8. Spiral
9. Pretty
10. Message and more

ANTIC GAMES DISK #3

1. Petals
2. Showdown
3. FROG: from ANTIC #3
4. Tank Battle
5. Draw: Guy Hurt
6. Plus Zero
7. Collisi, and more

ANTIC GR. & SO. DEMO #1

1. Graphic
2. Draw
3. Rainbow
4. Giggle
5. Tune Rite
6. Etch Sketch
7. Baby Pro Sound and more

ANTIC MUSIC DISK #1

Requires Music Composer Cartridge

1. Prelude
2. Joplin
3. In My Life
4. Work Week
5. Star Trek
6. Daisy
7. Moon River
8. Greensleeves
9. Yellow Submarine, and many more

ANTIC PHOTO GRAPHICS

Digitized Photos

ANTIC presents these programs in diskette form for the convenience of the ATARI community, in the belief that all of the programs offered are in the Public Domain and that no proprietary interests or rights to these programs are claimed by anyone. These diskettes are not copyprotected, nor does ANTIC claim rights to the programs themselves. The price of the diskettes is based on the cost of making them available.

CASINO CRAPS WITH ODDS

(game for adults)
Janpro Products
P.O. Box 1028
1056 W. La Deney
Ontario, CA 91762
(714) 983-3817
16K — Cassette; 24K — Diskette
$19.95

Graphics roll the dice with pass-line and odds bets. Shows odds offered on different numbers and points. Designed to teach how to play "Craps" and take advantage of the odds that are offered while "shooting craps" in any gambling casino.

1080 VERSAMODEM

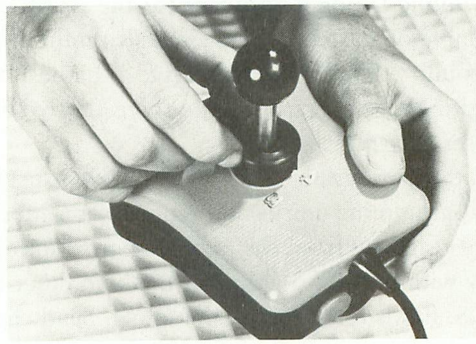
(modem)
Bizcomp
P.O. Box 7498
Menlo Park, CA 94025
(408) 745-1616
$139.00

A new direct-connect modem that can be used for remote databank access, timesharing, stock broker systems, videotex and electronic mail. You can link to The SOURCE, CompuServe, Dow Jones and other information utilities as well as on-line services via standard data terminals. VersaModem operates at 300 baud or below, using Bell Standard 103 protocol.

VOLTAGE SURGE SUPPRESSOR

(voltage regulator)
PANAMAX
150 Mitchell Blvd.
San Rafael, CA 94903
(415) 472-5547
$127.00 (includes noise filter option)

For ATARI systems the manufacturer recommends the four-outlet unit, SS120/4LCSN, which handles both surge and noise. Unit has a response time of trillionth of a second and clamps the voltage well below damaging levels.



PROSTICK II

(game controller)
NEWPORT CONTROLS
15425 Los Gatos Boulevard
Los Gatos, CA 95030
(408) 358-3439
$24.95

Improved arcade-style joystick has redesigned gateplate to capture correct direction for maze-type games (PAC-MAN, Donkey Kong, etc.) Two "soft-touch" firing buttons have been moved to the top end of the base allowing either right- or left-hand play. Backed by five-year limited warranty.

PINBALL CONSTRUCTION SET

by Bill Budge
(game utility)
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
48K — Diskette
$39.95

Computerized erector set allows you to design and play your own pinball games, built from a library of pinball-machine parts. These include bumpers, balls, flippers, targets, and more. Construction is accomplished with joystick.

Options include a sophisticated graphics painting and editing system, on-screen "wiring," and user-defined physical properties like time and gravity. Three complete examples come on the disk.

PRINCESS AND FROG

(game)
Romox, Inc.
501 Vandell Way
Campbell, CA 95008
(408) 374-7200
16K — Cartridge
$44.95

As in the fairytale, the frog becomes a prince when he kisses the princess. The frog must cross a field of jousting knights to reach the castle, and hop over a perilous moat filled with alligators and snakes. If your player doesn't hop through the lip-shaped castle gates, he's just another frog.

CERMETEK 212A

(modem)
Micro Systems Exchange
P.O. Box 4033
Concord, CA 94524
(415) 355-7130
$560.00

A bilingual modem, the 212A communicates at both 1200 baud and 300 baud — using DSPK and FSK signaling techniques. It connects via a standard phone line and includes a convenient auto-dialer. You select from a menu of standard options and can develop custom features entirely in software.

CHESS

(game)
Odesta
930 Pinter
Evanston, IL 60202
(800) 323-5423
(312) 328-7101 (inside Illinois)
48K — Diskette
$69.96

Explore the frontiers of intelligence with Odesta's new chess game by Larry Atkins, one of the foremost theoreticians of computer gaming. Play yourself, the computer or another player. Features a ten-minute, auto-demonstration mode and a library of many classic games from the history of chess.

MONKEY WRENCH II

(utility)
Eastern House Software
3239 Linda Drive
Winston-Salem, NC 27106
(919) 924-2889
$59.95

ROM cartridge that plugs into the right-hand slot of the 800 to augment ATARI BASIC. It provides a total of 18 BASIC commands and 16 machine language commands. These commands include automatic line numbering, hex and decimal conversion, finding and exchanging strings and scrolling up and down.

THE POWER MODULE

(memory expansion module)
AMIGA Corporation
3350 Scott Boulevard
Santa Clara, CA 95051
(408) 748-0222
$44.95

An alternative to ROM cartridges for the Atari VCS. Plugged into the game machine, it provides 6K RAM and and a microprocessor to receive and use game programs loaded from a cassette recorder. Pre-programmed tapes for the module are much cheaper than ROM cartridges, and the extra RAM enhances graphics and play.

BASIC EXERCISES FOR THE ATARI

(book)
SYBEX
2344 Sixth Street
Berkeley, CA 94710
(415) 848-8233
258 pages
$12.95

Step-by-step examples show how to solve problems with ATARI BASIC. You will learn programming techniques to do mathematical, financial and statistical computations as well as write games and data processing. Can be used with the ATARI 1200XL.

DISKWIZ

(disk editor)
Allen Macroware
Post Office Box 732
Tehachapi, CA 93561
(213) 376-4105
16K — Diskette
preferably two disk drives
$31.95

Provides disk editing repair and duplication for ATARI and PERCOM drives. Repairs DOS/non-DOS sectors with on-screen Hex/ASCII editing. Will print all modes to any printer and will print inverse and special graphics characters to Epson Graftrax and NEC 8023A printers. File trace. Block move. Retrieves deleted files. Has onboard disassembler and a complete manual.

VIDEOMAX GAME GLOVE

(game glove)
Nancy and Company
Video Accessories
22594 Mission Blvd., Suite 302
Hayward, CA 94541
(415) 582-2246
$6.95 each

Kid-leather, racing-style glove made exclusively for protecting your hands during joystick play. Available in white, navy or gold, for men, women and children, and for right or left-handers.

DISK FIX KIT

(drive maintenance kit)
The Programmer's Workshop
5320 Clark Ave., Suite 23
Lakewood, CA 90712
(213) 804-1475
$29.95

Designed for use on the ATARI 810 Disk Drive. Contains the set up disk, including read, write, kill and speed adjustment, head and rail cleaner, rail oil, adjustment tool, swabs and instructions.

THE PROGRAMMER'S WORKSHOP

(utility)
Synergistic Software
830 N. Riverside Dr., Suite 201
Renton, WA 98055
(206) 266-3216
32K — Diskette
$34.95

Actually seven separate programs designed to assist programmers with programming details. Includes disk-to-cassette transfer, BASIC-program comparison capabilities, cassette baud-rate increase, and two types of program-code analysis. MICRO-DOS, one of the crucial programs, resides in RAM and supplies easy access to the DUP.SYS. functions.

SUSPENDED

(game)
Infocom, Inc.
55 Wheeler Street
Cambridge, MA 02138
(617) 492-1031
$49.95

A science fiction nightmare that challenges players to save the entire population of a planet in deep space. One player controls multiple characters (the six robots that help save the planet). The player must work in a limited state of cryogenic suspension while coordinating the movements of the robots.

CASTLE WOLFENSTEIN

(game)
Muse Software
347 N. Charles St.
Baltimore, MD 21201
(301) 659-7212
32K — Diskette
$29.95

ATARI owners can now play this popular and prize-winning game by Silas Warner. It is a sight-and-sound spectacular which requires quick responses and thinking to escape the Castle alive.

ATARI TERMINAL

continued from page 35

Telelink also performs other ASCII/ATASCII translations, and has a wrap-around feature that takes words that will not fit at the end of a screen line and puts them on the next line. But other than a dump-to-printer capability, it has little else. Specifically, it does not provide for uploading or downloading, does not copy to disk or cassette, does not permit any translation option other than ASCII/ATASCII, and works only at 300 bps. Consequently, I characterize Telelink as pretty dumb.

There are several programs available that do much more than Telelink, even in the public domain.

There are several programs available that do much more than Telelink, even in the public domain. For obvious reasons, I prefer the latter. Also, because the public domain programs enjoy wider use (because of the price), the authors get more suggestions for improvements and others try their hands at incorporating new features.

JTERM is an excellent, general-purpose, terminal program for use with hosts that speak either ASCII or ATASCII. It recently appeared in COMPUTE! ("Download/Upload for the Atari", by Frank C. Jones; Issue 32; January, 1983; page 202), along with instructions for its use. JTERM is easily modified to work at 1200 bps.

Jim Steinbrecher wrote the other really excellent public-domain terminal program, called AMODEM. I find it easier to use than JTERM. If you are accessing a CP/M bulletin board that has a file-transfer program called XMODEM, or an Atari-based AMIS board with this same protocol, it's the only way to go. With this combination, uploading and downloading machine language, tokenized BASIC, and Music Composer files as well as listed BASIC and text files is all automatic. There is no need to worry about translation options, and if it determines an error has been made in the transfer of a 128-byte data segment, it automatically tries again up to nine times.

AMODEM can also be used with the other Atari-based bulletin boards to transfer listed files and text. A nice documentation file by Jim, and another document called "The XMODEM, AMODEM, CP/M Saga", by Greg Leslie, are available on bulletin boards.

AMODEM, Version 4 and lower, won't work at 1200 bps because of interaction with BASIC. Terminal operations and data transfers that do not use the XMODEM protocol work at 1200 bps with AMODEM Version 4.2 and higher. Speed options of 300, 600, and 1200 bps can be picked from an internal menu without any changes to the program. However, uploading and downloading at 1200 bps with the XMODEM protocol is marginal.

SOFTWARE AT THE OTHER END

Just as there are a variety of programs available to turn your ATARI into a terminal, so are there a variety for the hosts. CP/M is widely used on systems that are a bit larger than the ATARI. Actually, CP/M is an operating system, which runs different programs upon your command. When used for a bulletin board, the set of programs that are accessible to a remote user are sometimes called RCPM. XMODEM, the file transfer program that works with AMODEM; BYE, which you say to sign-off; and MINIRBBS, a message system, are all RCPM programs.

Quite naturally, most of the bulletin boards devoted to Atari enthusiasts are ATARI. The SYSOP (system operator) wouldn't be devoting a machine to this application unless he too is an Atari enthusiast. ATARIs won't run CP/M, so at least four bulletin board programs have been developed to run on ATARIs. These are, in approximate order of their popularity: AMIS, from the Michigan Atari Computer Enthusiasts, which has the XMODEM file-transfer protocol; ARMUDIC, by Frank Huband; TARI-BOARD, by Bob Alleger; and Atari Bulletin Board System, by Rod Roark. In the list of bulletin boards that concludes this article, they are abbreviated AMIS, ARMU, TARI, AND ATAB. (I didn't use ABBS for the last abbreviation to avoid confusion with the Apple Bulletin Board System. As I'm not a SYSOP, I don't know a whole lot about any of these programs, except that they work.

Quite naturally, most of the bulletin boards devoted to Atari enthusiasts are ATARIs.

Then there are a host of other hosts. Most time-share systems can be accessed with your ATARI terminal.

DOWNLOADING WITH MINIMUM TYPING

At this point, you may be caught in chicken-and-egg dilemma. "I can get one of the fine, free terminal programs by downloading it with my fine, free terminal program that I got by downloading . . ." Jim Steinbrecher has come to your aid with another terminal program called MINIATERM. The intent of this program is to get you started with minimum typing. You only need to use it once, to get AMODEM or JTERM. It is presented here with Jim's permission and encouragement. I couldn't resist making a couple of changes that let it work with either ASCII or ATASCII speaking hosts.

You should save a copy of MINIATERM on cassette or disk before you use it. As the procedures for loading MINIATERM and logging on a bulletin board are the same as for other terminal programs, they are discussed in the next section.

Once you have examined the bulletin board, as outlined in the next section, and found a program you want to download, give the host the command to send it to you. Then press START. This turns on the buffer that saves each character. Everything that is being saved is displayed on the screen. If the host speaks pure ASCII, a small triangle will appear at the beginning of each line except the first. These are the line feeds, don't worry about them. When the whole program has been downloaded, press SELECT. The ATARI will ask what device you want it saved to. In the case of a disk drive, you must also give it a standard filename (eg: D:FILENAME.TYP). It will then save the file and return to the terminal mode. If you find that you picked the wrong translation option, you don't have to hang up and call again. Just press [RESET] and type RUN to start over. It's as simple as that.

Listing 1

```
10 REM :  MINIATERM BY JIM STEINBRECHER,
   ARCADE BBS 313-978-8087
20 REM :  MODIFICATIONS AND ADDITIONS
   BY BILL HOUGH 215-783-5969
30 C=FRE(0)-100:DIM D$
   (15),BUFF$(C):BUFF$=
   " ":BUFF$(C)=" ":
   BUFF$(2,LEN(BUFF$))=BUFF$:
   ? " BUFFER = ";C;" BYTES"
40 ? :? " DOES THE HOST SPEAK (1)
   ASCII OR":? " (2)
   ATASCII? ANSWER 1 or 2."
50 OPEN #1,4,0,"K:"
60 GET #1,ANS:IF ANS=49 THEN TRANS=0:GOTO 90
70 IF ANS=50 THEN TRANS=32:GOTO 90
80 POKE 712,50:FOR I=1 TO 30:NEXT I:POKE 712,0:GOTO 60
90 SAV=0:CLOSE #2:XIO 34,#2,
   192,0,"R:":XIO 38,
   #2,TRANS,0,"R:":
   OPEN #2,13,0," R:":
   XIO 40,#2,0,0,"R:"
100 SETCOLOR 2,7,4:? :? " * TERMINAL MODE *"
110 STATUS #2,C:IF PEEK(747) THEN GET #2,C:? CHR$(C);:
    IF SAV THEN POKE ADDR,C:ADDR=ADDR+1:GOTO 110
120 IF PEEK(764)<255 THEN GET #1,C:PUT #2,C:GOTO 110
130 IF PEEK(53279)=7 THEN 110
140 IF PEEK(53279)=6 AND SAV=0 THEN SAV=1:
    ADDR=ADR(BUFF$):SETCOLOR 2,2,4:
    ? :? " * SAVE ON *":GOTO 110
150 IF PEEK(53279)<>5 OR SAV=0 THEN 110
160 CLOSE #2:? :? " SAVE TO DEVICE (ENTER C,P, or":
    ? " D:FILENAME.TYP)": INPUT D$:
    IF LEN(D$)=0 THEN 90
170 TRAP 160:OPEN #2,8,0,D$:TRAP 200
180 FOR I=1 TO ADDR-ADR(BUFF$)+1:
    BYTE=ASC(BUFF$(I,I)):
    IF BYTE<32 AND  NOT TRANS THEN NEXT I
190 PUT #2,BYTE:NEXT I:GOTO 90
200 ? :? " BUFFER EMPTY":GOTO 90
```

EXPLORING A BULLETIN BOARD

Now it's time to explore a bulletin board. If you have an Interface Module, you must turn it on before you turn on the computer. If you are using Telelink or a terminal program on cassette, the RS-232-C handler will boot from the Interface Module when you turn the computer on. If your terminal program is on a disk, the diskette must have a copy of the AUTORUN.SYS file that came with the Atari DOS 2.0S master diskette. When the computer is turned on, AUTORUN.SYS boots the RS-232-C handler. The instructions for the Interface Module are quite clear on the proper order for powering-on the different pieces.

Set your modem for call-originate and full-duplex, and make sure it is also turned on. Now, LOAD and RUN your terminal program. (Telelink I, being a cartridge, will automatically gain control.) If the terminal program asks for options (Telelink and AMODEM don't), pick these: download, light-translation or ASCII, no-parity, full-duplex. Also make sure your modem is set for the right speed

continued on page 95

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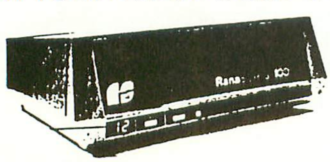
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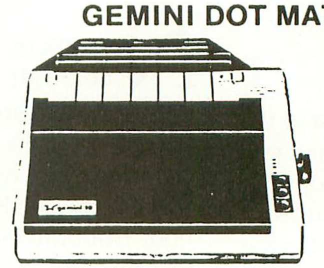
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ATARI TERMINAL
continued from page 93

as determined by your terminal program (300 bps for unmodified programs). If things don't go quite right, you might have to try a different translation option or parity setting (try even first).

Call the bulletin board as though you were placing a voice telephone call. If the bulletin board system is on-line, it will automatically answer after one or two rings and return a high-pitched tone. This is your signal to switch to the data mode. If you have an acoustic coupler, this means placing the telephone handset into the cups on the modem. With a direct-connect modem, there is probably a switch that says "talk/data". Turn it to "data".

On your modem, a lamp is lit that indicates it too can hear the high-pitched tone. If nothing else happens, press RETURN a few times; the bulletin board should wake up and announce itself on your screen. Many bulletin boards first ask how many "nulls" you need. Your ATARI needs none, so type "0" (zero). ATARI-based hosts might ask if you need line feeds. You don't. It will also ask for your name, probably location, and possibly some other questions, like can you support lower case (Yes).

After it is satisfied that you haven't dialed a wrong number, it will tell you about itself and how to access the message file and the program files available for downloading. Pay close attention to the commands it needs to pause (usually CONTROL-S), to resume (usually CONTROL-Q or any character), to abort a file listing (usually CONTROL-C), and to disconnect (usually CONTROL-D, "G", or with RCPM, "BYE"). It may or may not understand a BREAK, and your terminal program may or may not send one. (Telelink does if you type a SHIFT-BREAK, and CONTROL-TAB seems to work with some other programs.)

After you have found the directory of programs for downloading, you must tell the host which to send. With ATARI hosts, this may be as simple as selecting a number from a menu. With an RCMP host, you say "TYPE" followed by the filename, or if you have AMODEM, "XMODEM S filename". With MINIATERM or JTERM, the save buffer must be turned on before the host begins sending the file. Most ATARI hosts wait for you to do this, and require that you send a [RETURN] when you are ready. After the program has been received, you must do whatever the terminal program requires to save it to your magnetic medium. Telelink can't save anything to magnetic media, and the last section tells you how to save what MINIATERM captures.

When you are finished talking to the bulletin board, it is polite to log-off with "G" or "BYE" or CONTROL-D or whatever it needs. Conversely, it is impolite to just hang up. But most hosts will automatically log you off if they don't hear anything from you for a while.

If it is a listed BASIC program that you have captured and saved, you can press [BREAK] or [RESET], type NEW, and ENTER the program from your magnetic medium. You can also turn the ATARI off and back on again. If some errors occur during the load, it's probably because you captured more than just the program. Don't worry about the errors, you don't want any statements that aren't numbered anyway. Now you can RUN the program, SAVE it, or anything else you could do if you had typed it in.

If the program you are capturing contains inverse video characters (value greater than 127 in ATASCII), you won't get them if you pick ASCII translation. As tokenized BASIC and machine language programs are almost guaranteed to contain these characters, you can try another translation option (ATASCII in MINIATERM). But be careful — with these types of files, any extraneous characters are disastrous.

Generally, it's only safe to use a translation other than ASCII when talking to another ATARI. The exception is RCPM with the XMODEM protocol, and AMODEM loaded in your ATARI. With that combination, everything seems to work. If you run into translation difficulties, read the Interface Module instructions and examine the XIO statements in your terminal program. Then, when you still can't make it work, leave a message for help on the bulletin board. The SYSOP should be able to get you going.

BULLETIN BOARDS FOR ATARIS

You now have everything you need, except for a host computer. The following list gives the phone numbers of bulletin boards devoted to ATARI users in the United States. Some of the RCPM systems aren't totally devoted, but do have ATARI programs available for downloading. I won't guarantee the accuracy of the list, and certainly not its completeness. New ATARI boards are cropping up all the time. Many bulletin boards are not 24-hour-a-day operations, but most will be on-line nights and weekends. If a voice answers, the voice will be able to tell you the hours of operation.

If there is not an ATARI bulletin board in your area, and you can't afford long-distance phone calls, you can still enter the world of data communications with a non-ATARI bulletin board. Ask your computer dealer, or a user's group for any microcomputer. Someone is sure to know the phone numbers for boards nearby. A very comprehensive list of bulletin boards can be obtained from a bulletin board in Santee, California. It's number is 619-561-7277. Right now, the list is bigger than an ATARI 48K memory will hold, and it takes about a half hour to get it at 300 bps. But just the first 80% of the list should serve to identify someone nearby.

continued on page 97

ATARI BULLETIN BOARDS

State	City	Phone Number	Type
CA	Cupertino	408-253-5216	AMIS
CA	San Francisco	415-587-8062	AMIS
CA	San Jose	408-298-6930	AMIS
CO	Denver	303-221-1779	TARI
CO	Denver	303-758-6233	AMIS
DC	Washington	202-276-8342	ARMU
FL	Miami	305-238-1231	AMIS
GA	Atlanta	404-252-9438	ATAB
GA	Atlanta	404-434-1168	ATAB
IL	Chicago	312-789-0499	RCPM
IL	Chicago	312-789-3610	AMIS
MA	Boston	617-266-7789	RCPM
MA	Boston	617-595-0211	AMIS
MA	Boston	617-667-7388	AMIS
MA	Boston	617-876-4885	AMIS
MI	Detroit	313-274-3940	AMIS
MI	Detroit	313-589-0996	AMIS
MI	Royal Oak	313-759-6569	RCPM
MI	Sterling H'ts	313-978-8087	AMIS
NJ	Madison	201-377-4084	TARI
NJ	Princeton	609-924-5875	TARI
NV	Las Vegas	702-733-9488	AMIS
NY	Long Island	516-561-6590	RCPM
NY	New York	212-598-0719	ARMU
NY	New York	212-699-0293	AMIS
OH	B'chw'd Falls	216-582-2797	TARI
OK	Oklahoma City	405-722-5056	ARMU
OK	Oklahoma City	405-848-9329	RCPM
OR	Eugene	503-343-4352	ARMU
PA	Allentown	215-398-3937	RCPM
PA	Easton	215-250-9471	AMIS
PA	Pittsburgh	412-655-2652	ARMU
PA	Philadelphia	215-836-5116	RCPM
PA	Erie	814-898-2952	RCPM
TX	Fort Worth	817-589-1254	ARMU
TX	Hawkins	214-769-3036	RCPM
WA	Seattle	206-228-9401	AMIS
WA	Spokane	509-582-5217	AMIS
WA	Yakima	509-575-7704	ATAB
WI	Madison	608-251-8538	AMIS
WI	Milwaukee	414-352-2772	AMIS

TECH TIPS

It is possible to bring to the screen for examination, the ATASCII characters on your disk by using the COPY function of DOS (selection C on the menu). When you are prompted "FROM,TO" type in the name of the file you want to look at, followed by a comma, and then "S:" or "E:". By doing this you are copying the file to the output device specified — in this case either "S:"creen or "E:"ditor. The data will display and scroll upward once the screen fills. Use CTRL-1 to start and stop the scrolling. To display the file again it is necessary to recopy the file to the screen or editor.

Using this method, you can view non-BASIC files, such as text files (e.g. documentation contained on disks, word-processor text files, etc.), Visi-Calc templates, PILOT and assembler files, without resorting to the software that originally generated the files. LISTed and SAVed BASIC files may also be viewed this way, but the latter, being tokenized, will be largely incomprehensible. *—David Duberman*

TELECHESS

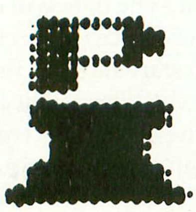
continued from page 43

the "G" option and press the button. The cursor will return to pink.

B — Begin New Game. Clears your board, but not your opponent's! Also clears the capture areas, and puts all pieces back in their original positions. If this option is selected, make sure both players use it simultaneously. Otherwise the boards will not match and moves will be impossible.

G — Game Mode. Both boards default to Game Mode, so "G" is only used to leave the Set-up Mode for return to normal play.

P — Pass. Game moves are transmitted automatically. If you want to "pass," i.e. not move this turn, type "Pass" and RETURN. Then each player selects "P" to flip the turn-indicating arrow on their own board.



It's possible, and probably will be necessary, occasionally to break out of data-transmission mode to communicate verbally. First, each player should depress the space bar to invoke the input prompt. Disconnect the phone from the modem and speak normally. When you wish to return to the game, replace the phone in the modem (or switch from Voice back to Data on a direct-connect modem). At this point, both players should press RETURN. If one cannot (it does happen), the other probably will be able to, whereupon data communication will be re-established. If neither keyboard responds (possible but not likely), it will be necessary for both to RUN the program again.

If you have a newer 850 interface, you'll be able to BREAK and RUN again. Otherwise, you'll find your BREAK key is disabled and it will be necessary to reboot. RESET at this point will probably cause a system crash, also necessitating rebooting.

```
1 REM ### Tele-Chess ###
2 REM Chessboard & players by
4 REM THOMAS MCNAMEE - 7/19/82
5 REM 850 link by Pete Goodeve 83:3:3
6 REM
9 CLR :RESTORE
10 DIM BOARD(8,8),B$(5),C$(5),HPOS(4),SIZE(4)
15 DIM WHITE(10),BLACK(10),ARROW$(6)
20 GRAPHICS 1
21 SETCOLOR 2,0,0
25 GOSUB 7000:REM POKE IN P/M MOVE ROUTINE
40 A=PEEK(106)-8
50 POKE 54279,A
55 PLM2=A*256
60 POKE 752,1:POKE 77,0
61 POSITION 6,4:PRINT #6;"wait a"
62 POSITION 6,8:PRINT #6;"moment.."
70 GOTO 540
80 REM *** PLOT ONE BOARD POSITION ***
90 PIECE=INT(ABS(BOARD(X,Y)))
100 B$="  ":C$="  "
110 IF BOARD(X,Y)>0 THEN B$=CHR$(BLACK(PIECE)):
    C$=CHR$(BLACK(0))
120 IF BOARD(X,Y)<0 THEN B$=CHR$(WHITE(PIECE)):
    C$=CHR$(WHITE(0))
130 POSITION X+6,Y*2+1:PRINT #6;B$
150 POSITION X+6,Y*2+2:PRINT #6;C$
160 RETURN
170 REM ** DRAW BOARD SUBROUTINE **
180 FOR X=0 TO 7:FOR Y=0 TO 8
190 GOSUB 90
200 NEXT Y:NEXT X
210 RETURN
220 REM ** DRAW CURSOR ***
230 REM - ERASE CURSOR AT OLD,
    DRAW NEW CURSOR AT VERT
240 A=USR(PAGE6,VERT,OLD)
280 RETURN
290 REM *** MOVE UP ***
300 OLD=VERT
310 VERT=VERT-8:IF VERT<21 THEN VERT=85
320 A=USR(1536,VERT,OLD)
330 IF M=6 THEN 440
340 IF M=10 THEN 490
350 RETURN
360 REM *** MOVE DOWN ***
370 OLD=VERT
380 VERT=VERT+8:IF VERT>85 THEN VERT=21
390 A=USR(PAGE6,VERT,OLD)
392 IF M=5 THEN 440
394 IF M=9 THEN 490
400 RETURN
430 REM *** MOVE RIGHT ***
440 HOR=HOR+8
450 IF HOR>152 THEN HOR=96
460 POKE HPOS(0),HOR
470 RETURN
480 REM *** MOVE LEFT ***
490 HOR=HOR-8
500 IF HOR<96 THEN HOR=152
510 POKE HPOS(0),HOR
520 RETURN
530 REM *** SET UP CHESSBOARD ***
```

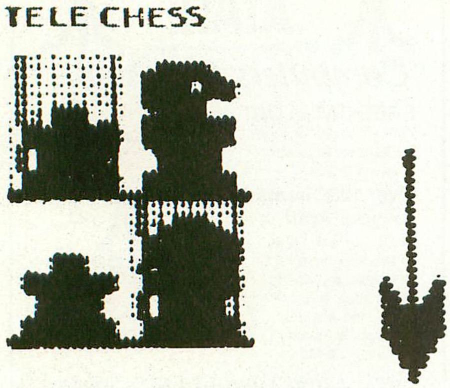
```
540 P0=PLM2+512
542 FOR T=0 TO 384:POKE P0+T,0:NEXT T
550 P0HI=INT(P0/256):P0LO=P0-P0HI*256
560 POKE 204,P0LO:POKE 205,P0HI
570 P1=PLM2+640:P2=PLM2+768
600 FOR T=0 TO 3
610 HPOS(T)=53248+T:SIZE(T)=53256+T
620 POKE SIZE(T),3:REM SINGLE SIZE
630 NEXT T
640 POKE 559,46
650 POKE 53277,3
660 POKE 704,74:REM CURSOR
670 POKE 705,68:REM BOARD
680 POKE 706,68
690 POKE 707,28
700 SETCOLOR 0,8,6:REM BLACK
710 SETCOLOR 1,12,10:REM WHITE
730 REM ** SET UP CURSOR **
735 PAGE6=1536
740 VERT=53
750 HOR=120
760 POKE SIZE(0),0
770 POKE HPOS(0),HOR
780 A=USR(PAGE6,VERT,0)
790 REM - PLAYERS 1 AND 2 ARE THE CHESSBOARD,
    4 SQUARES EACH
800 POKE HPOS(1),96
810 POKE HPOS(2),128
820 POKE 623,4:REM PLAYFIELDS HAVE PRIORITY
830 A=51
840 FOR T=20 TO 76 STEP 8
850 FOR X=0 TO 7
860 POKE P1+T+X,A
870 POKE P2+T+X,A
880 NEXT X
890 IF A=51 THEN A=204:GOTO 910
900 IF A=204 THEN A=51
910 NEXT T
915 REM *** LOAD CHARACTER DATA ***
920 FOR T=0 TO 6
930 WHITE(T)=35+T:BLACK(T)=3+T
940 NEXT T
950 BLACK(7)=ASC("S"):BLACK(8)=ASC("B"):
    BLACK(9)=ASC("G"):BLACK(10)=ASC("P")
960 ARROW$(1)=CHR$(60):ARROW$(2)=CHR$(45)
970 ARROW$(5)=CHR$(13):ARROW$(6)=CHR$(30)
975 ARROW$(3,4)="  ":REM 2 BLANK SPACES
980 REM *** REDEFINE CHARACTER SET ***
990 REM - CHARACTER SET WILL OCCUPY FIRST
    512 BYTES OF P/M AREA
1000 POKE 756,INT(PLM2/256)
1005 RESTORE 1140
1010 POSITION 0,17:PRINT #6;"MENU>"
1020 POSITION 0,0:PRINT #6;"BLACK":
     POSITION 14,0:PRINT #6;"white"
1030 FOR T=0 TO 511:REM RELOCATE OLD SET
1040 POKE PLM2+T,PEEK(57344+T)
1050 NEXT T
1060 FOR T=24 TO 72 STEP 8
1070 CHK=0
1080 FOR X=0 TO 7
```

continued on next page

```
1090 READ A:POKE PLM2+T+X,A
1100 CHK=CHK+A
1110 NEXT X
1120 READ A:IF A<>CHK THEN PRINT
     "INCORRECT DATA STATEMENT":STOP
1130 NEXT T
1135 FOR T=0 TO 7:READ A,B,C
1137 POKE PLM2+240+T,A:POKE PLM2+104+T,B:
     POKE PLM2+224+T,C
1139 NEXT T
1140 DATA 126,126,60,60,60,126,126,255,939
1150 DATA 0,0,0,0,0,0,24,24,48
1160 DATA 0,0,0,90,126,126,126,90,558
1170 DATA 0,56,124,118,126,120,56,126,726
1180 DATA 0,0,24,60,126,126,126,60,522
1190 DATA 24,60,126,126,126,60,24,24,570
1200 DATA 24,24,24,126,126,24,24,60,432
1210 DATA 120,0,30,60,0,60,30,0,120
1220 DATA 255,255,255,30,0,120,60,0,60
1225 DATA 120,0,30,0,0,0
1230 REM *** LOAD BOARD ARRAY WITH
     INITIAL VALUES ***
1280 FOR T=0 TO 7:BOARD(T,8)=0
1285 BOARD(0,8)=7:BOARD(2,8)=8
1290 BOARD(5,8)=9:BOARD(7,8)=10
1295 GOSUB 4500:REM set up comm link
1300 PRINT CHR$(125):PRINT :PRINT
     "     ** SETTING UP FOR NEW GAME **"
1310 FOR X=0 TO 7:FOR Y=0 TO 7
1320 BOARD(X,Y)=0:REM CLEAR BOARD
1330 NEXT Y:NEXT X
1340 RESTORE 1410
1350 FOR T=0 TO 7
1360 BOARD(1,T)=-1
1370 BOARD(6,T)=1
1380 READ B:A=0-B
1390 BOARD(0,T)=A:BOARD(7,T)=B
1400 NEXT T
1410 DATA 2,3,4,6,5,4,3,2
1420 GOSUB 180
1430 FOR T=2 TO 15:REM ERASE CAPTURES
1440 POSITION 1,T:PRINT #6;"    ":REM 4 BLANK SPACES
1450 POSITION 15,T:PRINT #6;"    "
1460 NEXT T
1470 X3=1:Y3=2:REM INITIAL PRINT POSITIONS FOR CAPTURES
1480 X4=15:Y4=2
1490 TURN=1
1500 PRINT "SET UP MODE"
1510 PRINT "BEGIN NEW GAME"
1520 PRINT "GAME MODE"
1530 PRINT "PASS TURN TO NEXT PLAYER";
1540 GOTO 1720
1550 REM *** MAKE MOVE SUBROUTINE ***
1560 M=STICK(0)
1570 IF STRIG(0)=0 THEN RETURN
1575 IF M=15 THEN RETURN
1580 IF M=14 OR M=6 OR M=10 THEN GOSUB 300
1590 IF M=13 OR M=9 OR M=5 THEN GOSUB 370
1600 IF M=11 THEN GOSUB 490
1610 IF M=7 THEN GOSUB 440
1660 RETURN
1670 REM *** CALCULATE BOARD POSITION ***
```

```
1680 X=(HOR-96)/8:Y=INT((VERT-21)/8)
1690 PIECE=BOARD(X,Y)
1700 RETURN
1710 REM *** MOVE ROUTINE ***
1720 POSITION 8,0:IF TURN=-1 THEN PRINT #6;ARROW$(1,4)
1730 IF TURN=1 THEN PRINT #6;ARROW$(3,6)
1740 POKE 704,74
1750 GOSUB 3100:REM GET MOVE maybe remote
1780 REM *** CHECK FOR MENU COMMAND ***
1790 IF PIECE<7 THEN 1920:REM NOT MENU
1800 POKE 704,100
1810 ON PIECE-6 GOTO 1830,1300,1720,2050
1820 GOTO 1720
1830 GOSUB 3000:REM make move
1860 IF PIECE=9 THEN 1720
1870 IF PIECE>6 THEN 1830
1880 PIECE=PIECE+1:IF PIECE>6 THEN PIECE=-6
1890 BOARD(X,Y)=PIECE
1895 GOSUB 4100
1900 GOSUB 90
1910 GOTO 1830
1920 IF SGN(PIECE)<>TURN THEN 1720
1930 POKE 704,14
1940 PIECE1=PIECE:X1=X:Y1=Y:REM SAVE OLD POSITIONS
1950 IF STRIG(0)=0 THEN 1950
1960 GOSUB 3000
1990 X2=X:Y2=Y:PIECE2=PIECE
2000 IF X1=X AND Y1=Y THEN 1720
2010 IF SGN(PIECE2)=SGN(PIECE1) THEN 1720
2015 GOSUB 4000:REM send move down link
2020 BOARD(X1,Y1)=0:X=X1:Y=Y1:GOSUB 90
2030 IF BOARD(X2,Y2) THEN GOSUB 2080
2040 BOARD(X2,Y2)=PIECE1:X=X2:Y=Y2:GOSUB 90
2050 IF TURN=1 THEN TURN=-1:GOTO 1720
2060 TURN=1
2070 GOTO 1720
2075 REM *** CAPTURE ROUTINE ***
2080 REM SOUND HERE
2090 IF BOARD(X2,Y2)>0 THEN 2140
2100 POSITION X4,Y4:
     PRINT #6;CHR$(WHITE(ABS(PIECE2)))
2110 POSITION X4,Y4+1:PRINT #6;CHR$(WHITE(0))
2120 X4=X4+1:IF X4>18 THEN X4=15:Y4=Y4+4
2130 RETURN
2140 POSITION X3,Y3:PRINT #6;CHR$(BLACK(PIECE2))
2150 POSITION X3,Y3+1:PRINT #6;CHR$(BLACK(0))
2160 X3=X3+1:IF X3>4 THEN X3=1:Y3=Y3+4
2170 RETURN
3000 GOSUB 1560
3010 IF STRIG(0) THEN 3000
3020 IF  NOT STRIG(0) THEN 3020
3030 GOSUB 1680:RETURN
3100 GOSUB 1560
3110 IF  NOT STRIG(0) THEN 3020
3120 IF PEEK(764)<>255 THEN 3400
3130 STATUS #1,CX:IF PEEK(747)=0 THEN 3100
3140 GET #1,CX:IF CX=ASC("%") THEN 3500
3150 INPUT #1,XM$
3160 ? :? XM$;
3190 GOTO 3100
3400 ? :INPUT XM$:? #1;" ";XM$:GOTO 3100
3500 INPUT #1,T,X1,Y1,X2,Y2,PIECE1
```

continued on next page



TYPO TABLE

Variable checksum = 1345269

Line num range		Code	Length
1 –	40	AL	349
50 –	130	LS	390
150 –	290	WI	277
300 –	394	KD	259
400 –	530	MH	220
540 –	660	MQ	323
670 –	780	YC	279
790 –	900	FW	320
910 –	1000	TL	461
1005 –	1110	IC	305
1120 –	1200	CJ	380
1210 –	1330	OF	480
1340 –	1450	EY	311
1460 –	1570	DQ	297
1575 –	1720	XK	366
1730 –	1880	DT	367
1890 –	2010	RT	246
2015 –	2110	DU	347
2120 –	3110	JQ	308
3120 –	3525	FF	275
3530 –	4030	NJ	293
4040 –	7020	SI	261
7030 –	8070	MG	306

```
3510 IF T=0 THEN 3600
3515 POP
3520 IF PIECE1=BOARD(X1,Y1) THEN 3550
3525 TURN=T
3530 ? #1;"*DOESN'T MATCH MY BOARD":GOTO 1720
3550 ? #1;"OK"
3560 PIECE2=BOARD(X2,Y2)
3590 GOTO 2020
3600 X=X1:Y=Y1:BOARD(X,Y)=PIECE1
3610 GOSUB 90
3620 GOTO 3100
4000 ? #1;"%";TURN;",";
X1;",";Y1;",";X2;",";Y2;",";PIECE1
4010 INPUT #1,XM$
4020 IF XM$="OK" THEN RETURN
4025 IF XM$(1,1)=" " THEN ? XM$:GOTO 4010
4030 ? :? "PROBLEM: ";XM$
4040 POP :GOTO 1720
4100 ? #1;"%0,";X;",";Y;",";X;",
     ";Y;",";PIECE
4110 RETURN
4500 DIM XM$(120)
4510 OPEN #1,13,0,"R1"
4520 XIO 40,#1,0,0,"R1"
4590 RETURN
6980 STOP
6990 REM *** P/M MOVE ROUTINE ***
7000 RESTORE 8010
7010 FOR T=1536 TO 1536+27
7020 READ A:POKE T,A
7030 CHK=CHK+A
7040 NEXT T
7050 READ A:IF A<>CHK THEN ?
     "INCORRECT DATA STATEMENT":STOP
7060 RETURN
8009 REM ** NOTE: Each DATA item in lines 8010-8070
        must be preceded by one space. **
8010 DATA 104, 104, 104, 168, 162, 6, 169, 255
8030 DATA 145, 204, 200, 202, 208, 250, 104, 104
8050 DATA 168, 162, 6, 169, 0, 145, 204, 200
8070 DATA 202, 208, 250, 96, 4299
```

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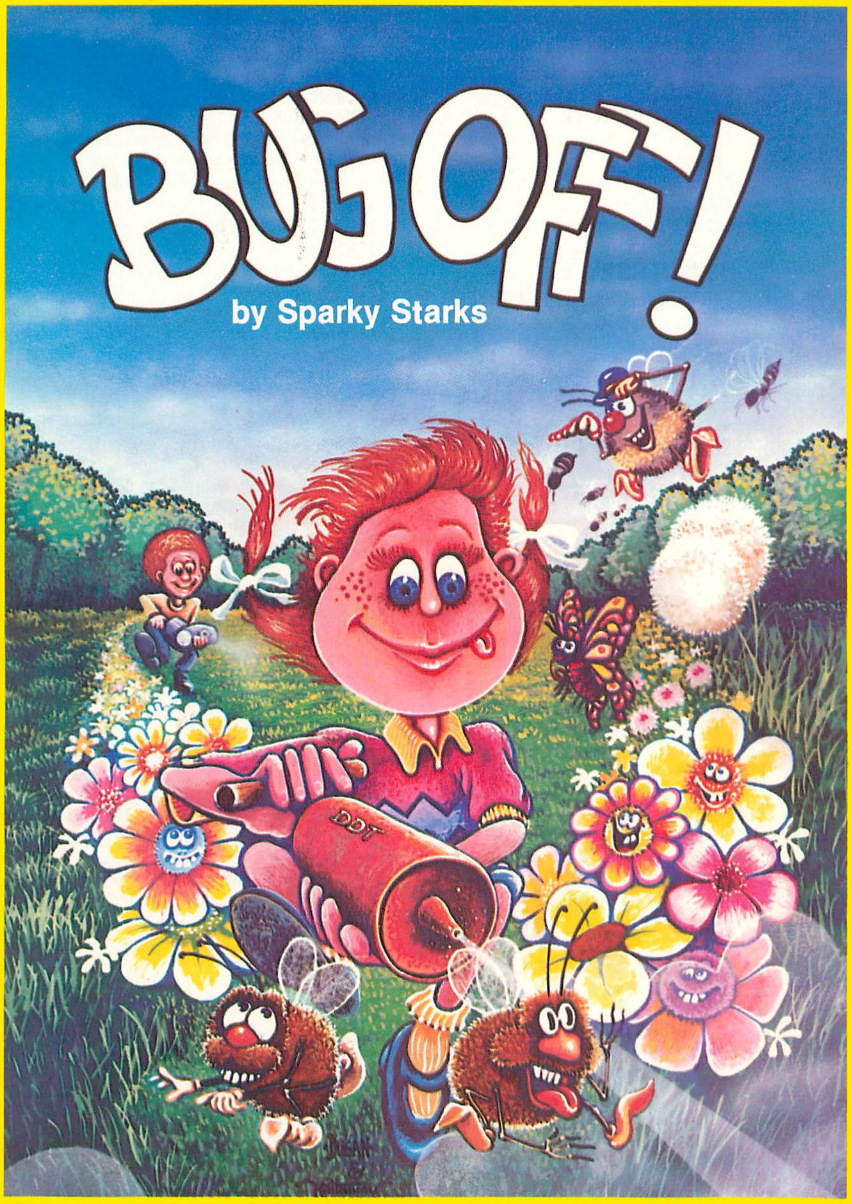
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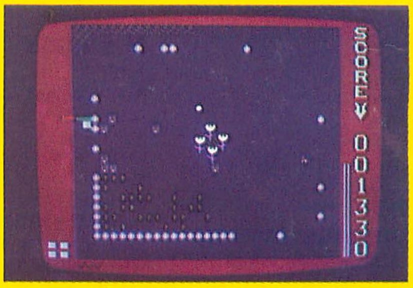
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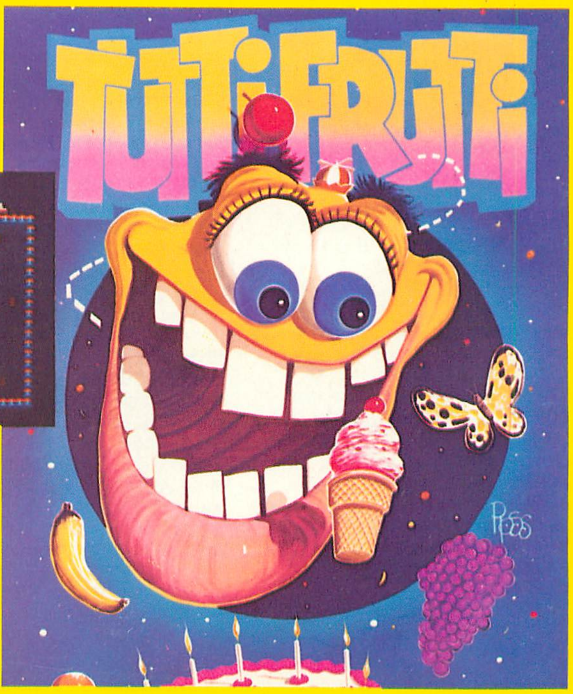
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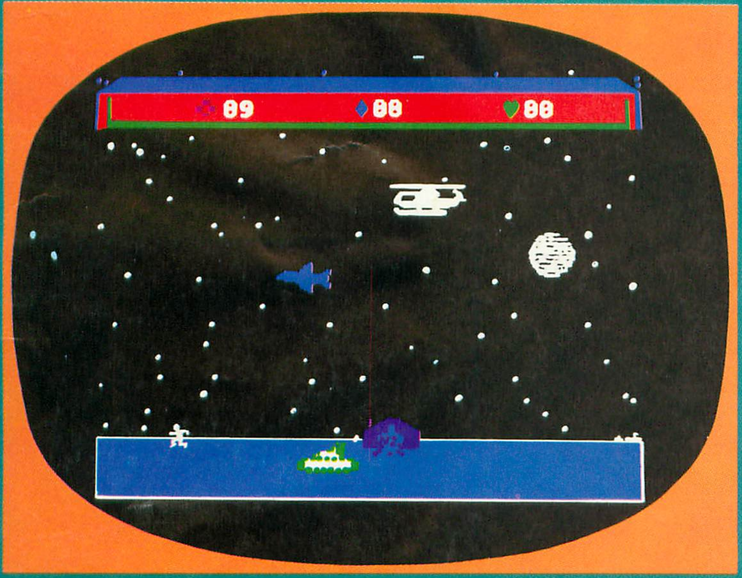
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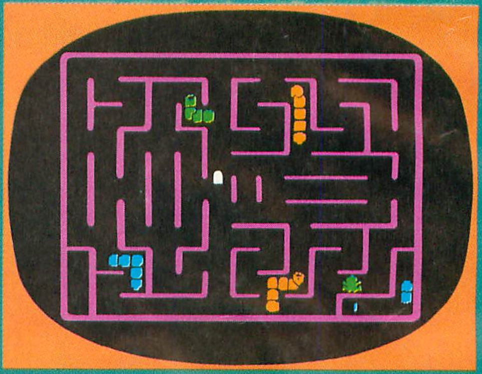


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